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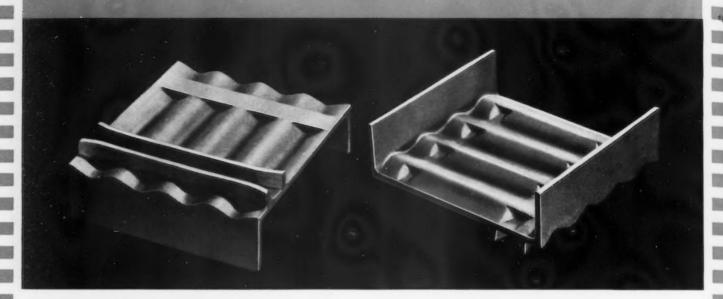
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This Week
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MARCH 27, 1941

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# Short Cuts to Success

TIMES have changed. In the old days boys of school age read books by Horatio Alger and similar authors and were imbued thereby with ambition to succeed the hard way. Nobody had then discovered the modern short cuts to success.

The idea then was that one must start at the bottom and through years of hard work, perseverance and thrift he might some day find himself at the top of some modest business enterprise and with enough money perhaps to leave a little to charity and something to his estate.

Even people who did not make the grade themselves must have believed in this approach to the goal of success, because the men who did attain it through this avenue were respected in their communities and looked upon as public benefactors as well as good business men.

Usually a success of this sort was the result of from 20 to 40 years of hard work and self-sacrifice on the part of some one individual or a small group of men who had the persistence and patience to carry on in spite of all obstacles. They built painfully but solidly and while the building was primarily done in the golden horse-and-buggy era of free enterprise, some of our best small and medium sized concerns, and in fact some of the large ones too, still carry on the tradition.

That was the tradition and procedure that made this country what it is, or perhaps, more accurately what it was, before the discovery of the shortcuts to success.

One of the first shortcuts to success put into practice was the financing shortcut. Smart people with money observed that these patient plodders who had worked long and hard to establish enterprises found themselves pinched at times for money. And when the pinch became severe enough, it was possible to put a squeeze play into effect and get control of the results of years of other people's work for a few dollars.

This method, while it was successful for a while had its disadvantages, because the people who employed it had at least to have some money available to make it work. Not much, but some.

Two other shortcuts to success have been devised since that time that enable the taking over of somebody else's business without putting up a penny.

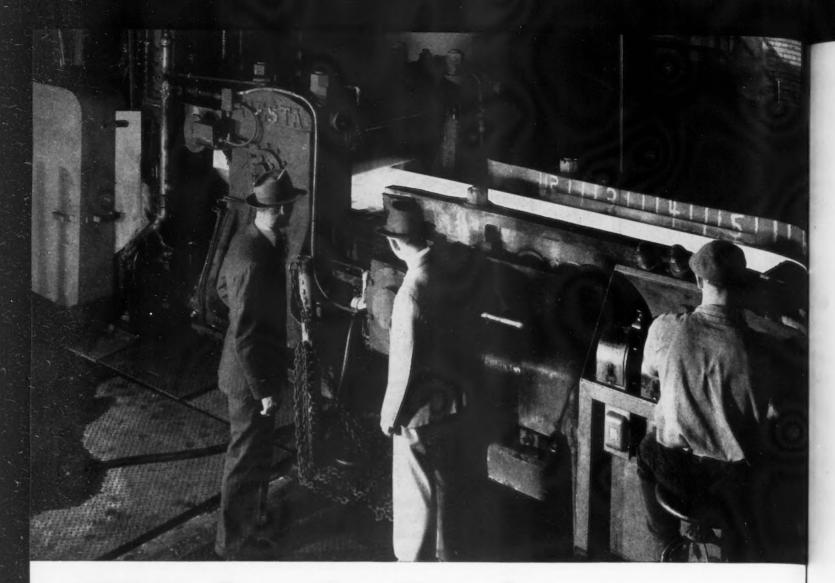
If you are a failure at the law, or at business, for example, you can go into politics. Then perhaps you will be elected to Congress and will have the power to impose taxes. Through that method you can confiscate the profits of business without having to undertake the responsibility of managing it.

But that method too has its disadvantages, for to be elected or appointed to office by one's fellow citizens, a man has usually to possess at least the rudiments of respectability and some degree of public acceptance,

Less onerous and taxing is the third shortcut. It consists in setting oneself up as a modern labor leader. Even communists are acceptable for that.

What is the use of working hard, like Henry Ford did, for 30 years to build up a business when you can seize control of it without ever getting a callous on your palm?

1 Housewell



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# High Speed Steel

—Data on recent English production research, including adaptation of "Durville Process" to secure more homogeneous ingot structure.

By H. W. PINDER

Metallurgist, William Jessop & Sons, Ltd.,

Sheffield, England

THEN a highly specialized section of an industry has an historical background of substantial maturity, it is only natural as the result of the high degree of stability achieved for given demands, that the production tends to remain on conventional lines set up in earlier times by the craftsmen and workers. High speed steel production falls into this class, where many producers still regard their products as possessing pecuproperties inherited processes and procedure based purely on convention.

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Some of the conventional procedures have been found to be true after scientific analysis. For instance, the hardening of a turning tool from the blacksmith's hearth. Such a tool was held in the hearth until the nose was seen to fuse, and after air blasting it was ground back on to sound metal and found to behave splendidly as a turning tool. Thus, the most effectively hardened portion having a grain size approaching the ideal was present in the portion of the tool required to do the work.

On the other hand many practices have often proved to be per-

sonal fancies. Modern demands have called for a high standard and consistent results in high speed steel products, and the basic principles of production have been modified by studying and applying the conclusions of practical researches, some of which are set out below:

- (1) High speed steel production.
- (2) High speed steel tool failures.
- (3) Cutting as affected by metallurgical considerations.

As regards high speed steel ingot production, it will be readily realized in high speed steel production that the most important feature, after taking precautions to make certain that the steel will cast into sound ingots, is to insure the optimum ingot structure. At the best under normal production the high speed steel ingot is highly heterogeneous, even within the outer dendritic shell, while along the axial zones the heterogeneities are most severe. This is readily illustrated in the photomicrographs, Fig. 1, which are taken from the outer dendritic zone of an 8-in. square ingot and the axial zone of the same ingot at positions midway between the top and the bottom. It is to be expected therefore that the greater the ingot section the more marked will be the difference in structure between the outside and center. This state of affairs persists because as freezing proceeds inwards from the ingot mold walls, the liquid portions become increasingly richer in carbon and alloying elements. This phenomena can be readily appreciated by referring to the modified equilibrium complex carbide-iron diagram. In addition, the larger the ingot the larger the axial zone, and therefore this portion retains more superheat. Consequently the freezing rate is slow. The chief consideration in producing high speed steel ingots of more uniform structure throughout the section is, therefore, the reduction of the freezing time between the outside and the center of the ingot. The principal factors affecting this are:

- (a) The casting temperature.
- (b) Ingot mold design.
- (c) The cross-section of the ingot.

The most difficult feature to control is (a), but this has been rendered much easier of late by the

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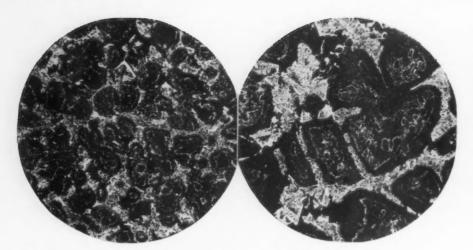


FIG. 1—A high speed steel ingot is very heterogeneous. These photomicrographs show the structure on the outside (left) and at the center (right) of an 8-in. square ingot, at the middle of the ingot. At 200 diameters.

use of the Schofield-Grace quick immersion pyrometer for measuring liquid steel temperatures. It should also be remembered that for an increased nozzle size lower casting temperatures can be used. If the casting temperature is too low and the rate at which the mold fills is slow, then gas is occluded in large amounts and an unsound ingot is the result. A crucible high speed steel ingot can be cast at a relatively low temperature because the rate of teeming from the pot can be very rapid.

As regards (b), the thicker the walls of the ingot mold, within reason, the quicker will be the freezing rate across the section of the ingot.

Factor (c) is governed by the type of product to be made, and it should be noted that wherever possible a minimum reduction in cross-sectional area of the original ingot of 96 per cent should be arranged.

Once the ingot is solid the structure can only be modified appreciably by hot work, and there are serious limitations to what can be accomplished when working to given sectional sizes.

One recent development which gives a more homogeneous ingot structure is represented by the "Durville Process." This process was originally conceived for the production of non-ferrous alloy ingots, which gave rise to large numbers of surface seams when cast in the normal way. Work in the research department, Woolwich, England, has shown some interesting results on various steels.

This process requires that the mold and ladle be fixed together in such a way that the closed side is in a straight line, as shown in the sketch, Fig. 2. Thus, when the ladle and mold are turned through an angle of 180 deg. at a given speed the mold becomes filled with the metal at a relatively quick rate. Such a method allows the metal to be cast at a low superheat without turbulence, resulting in a minimum of trapped gas. Casting steel from a normal ladle at such a low superheat would prove impracticable because the metal would tend to freeze round the nozzle and gas would be trapped in the ingot. Alloy steel ingots cast in this way have shown a remarkable reduction in ingotism, and solidification has occurred over a very much reduced freezing range. Applying this idea to high speed steel, it means that freezing can occur at the same time from many more centers than is normally the case. A finer macro grain is the result and the carbide envelopes are finer.

When casting high speed steel ingots by the normal method a compromise must be made between too high and too low a casting temperature. Casting at too low a temperature would result in an unsound ingot due to the fact that gas coming out of solution would be trapped in a rapidly solidifying ingot, while feeding through the head would be out of the question. At present the largest ingot cast by the "Durville Process" has a weight of 60 lb., but no doubt larger ingots could be cast successfully after trials had been made. Limits to the size of ingots would

still persist, but where large tools are to be produced it should be noted that by first slightly reducing the cross-section of the ingot then cutting into two and upending to a larger cross-section than the original ingot and continuing normal forging from this section, the scope of tools to be made would be much larger. Apart from this, modification in the "Durville Process" might lead to larger ingots being produced.

Although the tool maker is asking for a high speed steel free

FIG. 2 — The Durville Process operates in this manner. The steel may thus be cast at a low superheat without turbulence.

from carbide bands, it is by no means proved that in moderation such heterogenieties are in themselves harmful. On the contrary, Grossman and Bain have noted the presence of such segregates in tools which have given excellent service, and the author can substantiate this evidence by recalling examples which have been noted during investigations on high speed steel tools which had given superior service.

It does seem desirable that a sample of high speed steel free from carbide segregates should be compared for performance with one in which they are present but otherwise similar in all respects. The former sample could readily be

prepared by careful selection of the outside portion of the ingot toward the bottom end.

# Casting and Forging

During an investigation to determine the effect of ingot size on the carbide structure, 4-in., 6-in. and 8-in. square ingots were produced from a ladle having a standard nozzle size and a constant casting temperature, in 18-4-1 and 18-4-2 steel. Both the ingots and cogged bars were examined at six positions (at the outside and center of the top, middle and bottom positions).

The ingot structures will be reviewed first. Sections examined from the outside of the ingots within the dendritic zones showed very little difference whether taken from the top, middle or bottom positions, and only minor differences in the structure were noted in sections prepared to include the axes of the ingots from the bottom positions but above the dendritic

zone. The most striking differences were noted at internal axial positions at the top and middle positions, the carbide envelopes being thicker in the 6-in. and 8-in. ingots than in the 4-in. ingots. These features are shown in the photomicrographs in Fig. 3. By taking the sectioned ingots and forging them to a common size of 13/4 in. square, the structures of the bars were examined at the six positions previously indicated.

As a result of the forging operations the carbide envelopes undergo distortion and local diffusion which is facilitated by a combination of mechanical work and temperature. This results in a redistribution of the carbide which along the axial portions show as discontinuous bands, while within the zone which corresponded to the dendritic shell of the ingot the carbide is much more uniform and free from banding. This effect is readily seen in the photomicrographs showing the outside and

center portions of a 6-in. square ingot, Fig. 4.

A number of workers have described the redistribution of the carbides as being due to the breaking and fragmentation of the carbide plates forming the eutectic. However, it is felt that this description is hardly true or complete. If actual breaking by fragmentation did occur this would be most likely to lead to bursting or to the development of small discontinuities in the metal. Moreover, it is difficult to conceive how a relatively hard but ductile carbide chiefly concentrated along the axial zones could be easily fragmented when embedded in a very soft matrix, which are the conditions obtaining at a forging heat. Further, the energy required to fragment the carbide under these conditions would be much more likely to burst the metal. What appears to happen is that as a result of surface tension together with diffusion, the carbides tend to ball up and this is

FIG. 3—Ingot structures at internal axial positions. At middle of 8-in. square ingot (upper left), and at bottom of same ingot (lower left); at middle of 6-in. square ingot (upper middle), and at bottom of same ingot (lower middle); at middle of 4-in. square ingot (upper right), and at bottom of same ingot (lower right). All views at 120 diameters.



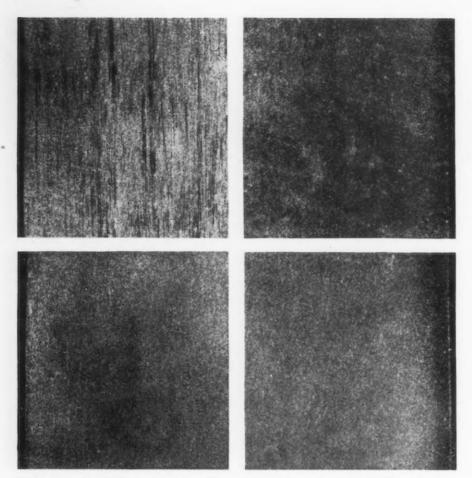


FIG. 4—Carbide envelopes undergo distortion and local diffusion during forging. Photomicrographs show center (upper left) and outside (upper right) at middle of 6-in. square ingot; center (lower left) and outside (lower right) at bottom of 6-in. square ingot. All views at 10 diameters.

accelerated considerably by mechanical work leading finally to a much more equitable distribution.

Comparing the results of carbide distribution after forging each portion of the ingot to 13/4-in. bar, it has been found that by repolishing a section etched in a dilute nitric acid solution, followed by re-etching in Rosenhain's reagent and repeating the last two operations as often as is necessary to produce a good contrast, examination at a magnification of 15 diameters gives a very good idea of the general distribution of the carbide. This method was used in producing Fig. 4, and this effect is shown graphically in Fig. 5 for a 6-in. square ingot at the outside and center of the top, middle and bottom positions. An examination of the carbide distribution at a magnification of 200 diameters, without that at the low power as described above, was not found to be so useful and was actually sometimes misleading. Both the high and low power examinations were considered necessary to give a complete picture of the carbide distribution. This method of approach led to the following conclusions.

- (1) That from all ingot sizes the best carbide distribution was obtained in the bottom third of the ingot.
- (2) That given a normal discard the next best position was the top third of the ingot.
- (3) That the center third portion was the worst position of the three, there being no sharp dividing line between the three portions.
- (4) Despite an insufficient reduction in area, the 4-in. square ingot had best carbide distribution of the three, while there was little differense between the 6-in. and 8-in. ingots.
- (5) Further reduction of the 134-in. square cogged bars to 1-in. diameter rounds established the superior carbide distribution in the 4-in. square ingot.
- (6) Special tools requiring the best possible distribution can be made from selected portions of the ingot.
- (7) Finally, it is not possible to make all high speed tools from 4-in. ingots, and by carefully controlling the casting conditions on the lines already stated, improved ingot structures should be obtained in larger sized ingots.

Part of the same investigation was devoted to noting the effect of

18-4-2

Outside Center Outside Center

18-4-1

FIG. 5—Graphical indication of distribution of carbides, for a 6-in. square ingot at the outside and center of the top, middle and bottom positions.

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different forging procedures on the structures of 8-in. and 6-in. ingots. The procedures were as follows:

- (1) Upsetting after cogging the ingot to 3\% in. square, and recogging in the direction of the ingot.
- (2) Normal cogging with a maximum amount of corner work.
  - (3) Slabbing and cornering.
  - (4) Forging in the press.

Of the four methods, slabbing with adequate cornering gave slightly the better carbide distribution, and adequate cornering proved beneficial in reducing to a minimum the undesirable cruciform structures. These structures,

if present, can readily be seen after hot etching, and tend to persist in square and rectangular sections. Their presence is due to a lack of work on the corners of the billet or bar, thus facilitating the migration of impurities starting from the center and decreasing in intensity toward the outside along the original diagonals of the ingot. This part of the investigation again showed the necessity of producing in the ingot the finest possible structure consistent with soundness.

In the production of tools where an upsetting operation is necessary, a 92 to 96 per cent reduction by straight forging should be given where possible, before the upsetting operation. Investigations have shown the necessity for this, as a normal upsetting operation does not redistribute the carbide to any marked extent where carbide bands persisted in the forged bar.

Benefits are to be gained however in other directions insofar that the metal is more dense after such an operation and the mechanical strength and toughness are more uniform in all directions.

Ed. Note:—Next week the author will conclude with data on high speed steel tool failures, metal-lurgical aspects of machining, etc.

# Punch Press Handling Time Halved

NEW hand trucks have been built specially to handle the 10-ft. sheets of electric steel from which a.c. and d.c. motor laminations are punched in the plant of the Reliance Electric & Engineering Co., Cleveland.

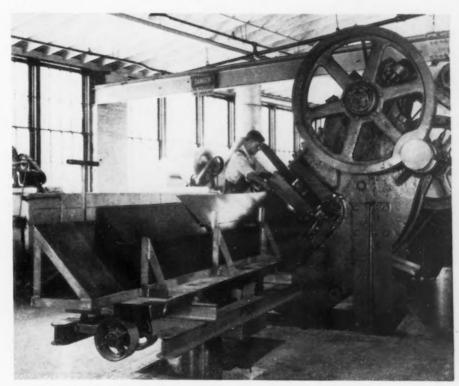
Each truck will carry 3 tons of sheet at a time, piled on a surface with a slope that matches the angle of tilt of the press plate. This makes unnecessary any additional positioning of the sheets as they are fed between the blanking dies.

A combination air-hydraulic lift, over which the loaded truck is run beside the press, is used to elevate the sheets to exactly the right working level. The lower edges of the sheets rest against angle iron uprights over which are fitted freely sliding sheet guides containing hardened vertical steel rolls. Preparatory to starting the blanking operations, the operator frees the top sheet by pulling it toward him and then letting it slide back against the guides. These, meanwhile, have dropped tightly against the surface of the remaining sheets.

The top sheet, sliding onto knifeedge projections on the guides, has its lower edge raised slightly above the rest of the sheets and its upper edge offset a couple of inches beyond the edge of the sheet pile. The decreased area left in contact with the sheet below, and the better hold provided by the projecting edge of the top sheet, serve to facilitate the operator's manipulation of the material from the truck through the press.

Previous practice has been to shear the sheets, approximately 10 x 3 ft. in size, into 3 x 1-ft. sections; these are fed into the press from 2-ft. high piles. The use of the specially designed trucks has permitted revising the procedure to considerable advantage. For the same size blanks, the 10-ft. sheets are slit into three strips of equal

width. These are loaded onto the truck, elevated beside the press as shown in the accompanying illustration, and fed into it from the same height piles. The same number of blanks is obtained with the new method of cutting the sheet; but with a reduction in the number of major handlings from nine to three, the handling time that is saved amounts to approximately 50 per cent.



THIS truck, built with sloping floor and special positioning fixtures, cuts the number of handlings of steel sheets from nine to three and the handling time by approximately 50 per cent.

# Finishing

# Die Castings . . .

PLATING and other finishing of zinc alloy die castings, especially for the automotive industry, is now done to standardized specifications which insure high quality. Nevertheless, it is unusual to find two shops which follow precisely identical methods and the equipment used varies widely.

One of the latest and finest setups for such work is found in the new plant of the Gerity-Adrian Mfg. Corp., Adrian, Mich. This plant and its equipment were designed especially for such work, a large part of which is for the automotive industry. Some zinc alloy die castings are plated for other industries but, to simplify procedure, these follow the same routine with certain minor exceptions. No castings are produced in the plant. All are shipped in by die casters, chiefly from plants in Toledo. Suppliers make a point of producing castings of maximum surface smoothness so that polishing and buffing operations are minimized.

A small proportion of the castings received, including such items as faucet handles for the plumbing trade, are tumble burnished, but much the largest part requires some grinding (or sanding), especially at parting lines, as well as buffing to prepare the castings for plating. Tumble burnishing is done dry in wood-lined barrels about 24 in. in diameter. A typical charge is about 1500 faucet handles which, together with burnishing ingredients, makes the barrels about half full. Burnishing is done in three steps-coarse, medium and finewhich require from three to 24 hr., depending on the initial smoothness of the castings and the grade of burnish required. In the initial or "cutting down" burnish, fruit pit granules and an abrasive are used and the barrels turn at about 21 r.p.m. In subsequent operations sawdust is used with a fine abrasive, such as tripoli and with the barrels turning more slowly, down

At Gerity-Adrian Mfg. Corp., an up-to-the-minute shop designed for efficient handling of large volume.

By JAMES GERITY, Jr.
Gerity-Adrian Mfg. Corp., Adrian, Mich.

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to 17 r.p.m. in the fine burnishing. The latter gives a high luster though one not quite equal to wheel buffing.

A great deal of polishing is done on muslin wheels to which abrasive is glued as in other plants. In general, the part is guided by hand, but some circular parts are held on rotating heads arranged in pairs so that the operator can load one part while another is being polished. The size of wheel is varied, as are the number of grinding operations, to fit the work to be done and to reach all surfaces which require polishing. For some work, such as horn rings, where it is necessary to grind in spaces such as the openings between spokes, excellent use is made of a special form of sander using a 1-in. abrasive belt running over three pulleys, one of which is mounted on the driving motor shaft. The second pulley is an idler and the third and smallest, about 1 in. in diameter, is on the end of a pivoted arm, making it possible for the belt to reach into openings otherwise hard to get at. An angle bracket carries the idler pulley and the pivoted arm and is adjustable along the bed of the machine so that the desired belt tension is readily maintained. A suction outlet below the belt carries off abrasive dust. This form of grinder is also useful for reaching into recesses between projecting parts which are too close together to be polished by ordinary grinding wheels.

Some castings received regularly in sufficient quantities to warrant the use of automatic grinding and polishing machines are handled with such equipment. In these



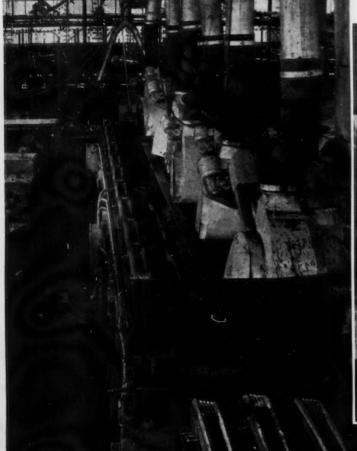
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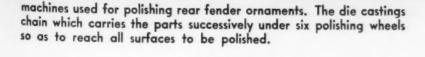
cases, the casting is first placed on a wooden form or holder made to fit the chain which carries it through the machine. The holder is then placed on the slowly moving chain and is carried forward successively under each of the polishing and buffing wheels, of which six are commonly used. At the end of the machine, the casting, completely polished and buffed, is removed and hung on a chain conveyor which carries it toward the cleaning machine, the form being returned to the loading end of the polishing ma-

RIGHT

THIS set of four tumbling barrels is employed for dry burnishing some small die castings, such as faucet handles.







polishing ns by a t angles



ABOVE

S PECIAL form of sander in which a I-in. belt is run over three pulleys, the smallest of which is at the end of lever, making it possible to reach into recesses hard to grind by other means.

chine to receive another casting. Some polishing is done on ordinary belt sanders when flat surfaces are to be finished. Buffing is accomplished with stitched muslin wheels which are kept supplied with stick polishing compound.

Castings are commonly toted to the polishing stations in hand trucks, often in the cartons in solvents." Racks of castings on a chain conveyor first enter a tank of the solution in which they soak for 45 sec. at 190 deg. F. In the second stage, another supply of the same solvent is applied by spraying under pressure. Then the castings are rinsed in water at 120 deg. F., and again in water at 130 deg. F. They issue bright and clean and ready

As racks issue from the cleaner and rinse, they are removed and hung on frames for passage through a Crown plating machine designed to dip them automatically in successive tanks forming the plating line. The steps in this process include:

(1) Dip for 19 sec. in a 4-oz.per-gal. commercial alkaline cleaner



OADING end of the copper and nickel plating line, showing, in the foreground, one of the carriers for plating racks and, beyond it, the copper plating tank.

which they are received. After polishing, small castings are placed in wooden trays and larger ones are hung on an overhead chain conveyor which advances them toward the cleaning machine. Near the latter, each casting is inspected and, when it passes inspection, is racked for passage through the cleaning machine.

Cleaning is done with a solvent preparation described as "a neutral emulsion of synthetic and organic for plating, which follows immediately. A feature of the cleaning is the removal of sediment (chiefly buffing compound) by a continuous flotation which is designed to keep the solvent clean and suitable for repeated use. Its condition is checked hourly to make sure that the solvent remains in the required condition. All of the solution is drawn off and cleaned by filtration once in 32 hr., with about 50 per cent recovery, it is stated.

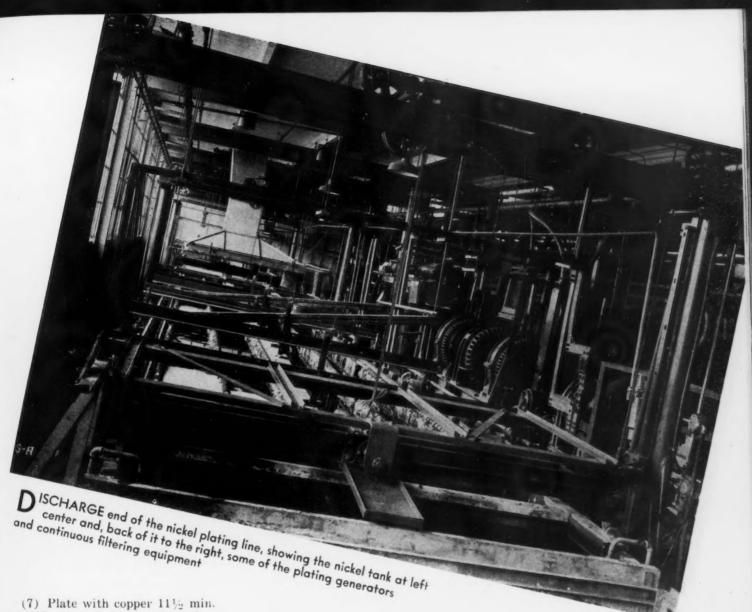
during which the castings are cleaned anodically.

(2) Rinse for 19 sec. in cold water.

(3) Dip for 19 sec. in 0.3 per cent sulphuric acid to neutralize any remaining cleaner and to remove any oxide film remaining on the castings.

(4), (5) and (6) Successive rinses, usually in cold water, although tanks are provided with steam coils for heating if desired.

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(7) Plate with copper 11½ min. in 2300-gal. tank during which time the castings are advanced from end to end of the tank by a chain. The tank has a conventional Rochelle salt solution which is heated to maintain a temperature of 163 to 170 deg. F. Current is supplied by a 6000-amp. generator to give a current density of 30 to 50 amp. per sq. ft. The result is copper plate having a thickness of 0.0003 to 0.0005 in.

(8) and (9) Water rinses of 19 sec. each.

(10) Dip in 0.75 per cent sulphuric acid to remove any oxide film.

(11) Rinse in water.

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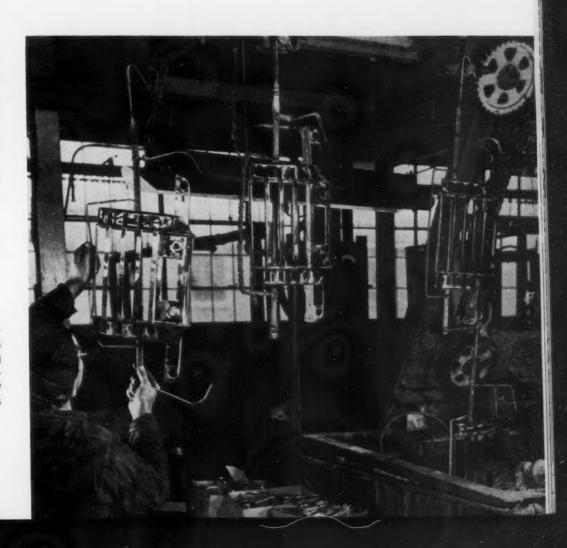
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(12) Bright nickel plate for 19 min., during which the castings are

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V IEW at loading end of the automatic chromium plating line. A chain conveyor carries the plating racks (each of which, in this case, accommodates a single large die cast radio grille) through the several tanks in the line.





AFTER castings are chromium plated, they are removed from racks (left) and are placed on the belt conveyor (right) which carries them through inspection to packing stations.

advanced through a 4000-gal. tank with automatic agitation. The solution is maintained at 135 deg. F. plus or minus 2 deg. Three generators, with a total capacity of 13,000 amp., supply current at a density of 50 to 80 amp. per sq. ft. and apply a plate ranging from 0.0009 in. to 0.001 in. in thickness.

(13) Cold water rinse, 19 sec.

(14) Hot water rinse, 19 sec.

As a result of this treatment, castings issue with a bright nickel plate and are ready for chromium plating when, as is usual, specifications call for this. In some cases, however, a small amount of buffing may be required if any areas of the castings are not sufficiently bright to meet requirements. Both the nickel and the copper solutions used are continuously filtered and continuously heated, the heating being done in heat exchangers.

At the beginning of the chromium plating line, the castings, previously nickel plated, are first given a 25-sec. cathodic alkali cleaning, are spray rinsed, given a 10-sec. dip

in water, are again spray rinsed and then enter the chromium plating tank. This plating line includes the use of a machine which advances the plating racks by means of a chain. The average plating time is 3 min. at a current density of 150 to 250 amp. per sq. ft. This results in a chromium plate of about 0.00002 in. thickness on top of the nickel plate. At the end of the plating, there follows a cold water dip and a cold water spray, after which the racks of castings enter a warm air duct, traveling toward a heater which warms them gradually. When castings issue from the duct they are dry and are removed from the racks and the latter continue back toward the cleaning tank. On the way, the racks receive a treatment to remove any chromium salts and are ready for re-use. The same racks used in copper and nickel plating are used also in chromium plating and there is no unloading of castings from the racks after nickel plating except in the case of castings which do not issue from the nickel plat-

ing sufficiently bright to go direct to chromium plating. All tanks are set with their bottoms well below floor level so that operators work at floor level.

All long-run work is handled in the automatic tank setup just described. Considerable short run work is plated in two 1500-gal. copper tanks and four 1500-gal. nicket tanks designed for hand operation.

At the end of the chromium plating line, all castings are de-racked and placed on a belt conveyor. The same is true of those castings which issue from nickel plating and do not require chromium plating. The belt conveyor carries the castings past inspectors who check the plating and return any castings on which plating imperfections are found. Those which pass inspection continue on the belt and, if required, are taken off at stations where tapping is done and/or inserts are put in place. Castings which require no further work continue to packing stations where they are placed in cartons for shipment. Occasional castings receive a light color buffing where the plating is not sufficiently bright to meet requirements, but the proportion of such castings is small.

Many castings, however, require the application of enamel in recesses provided for the purpose, and those to be enameled are shunted into a room provided with the latest form of equipment for this purpose. The room is sealed to prevent the entry of dust and is supplied with filtered air under a slight pressure so that leakage, if any, is always outward rather than inward. All plated work is handled with white gloves (although they were omitted when the accompanying photographs were taken) to avoid finger marking of castings. Four spray booths are provided and they have bottom suction outlets so that any sprayed enamel which does not adhere to castings or masks is drawn downward and cannot reach breathing level.

Masks are of a special type made originally by plating steel or iron onto a die casting and afterward stripping the heavy plate which thus fits the casting perfectly. The mask is trimmed, of course, so that only the parts of the casting to be sprayed are exposed. Edges of the mask, which mark the cut-off, are turned downward a short distance instead of being perfectly flat. Thus, when the letters of a name, for example, are being masked (the letters being raised above the sprayed background of the castings) the edges of letters are partly or fully covered by the downturned edges of the mask. In consequence, these plated edges remain bright (as well as the face of the letter) and the depth of the letter thus revealed makes it stand out prominently against the enamel of the background. Masks made in this way can be used repeatedly, in some cases for as many as 15 times without cleaning, as the downturned edges of the mask help to keep the back face of the mask free of enamel. When masks, which are made in duplicate, require cleaning, they are dropped in solvent and the other one of the pair, previously cleaned in the same way, is put in use while the first one is being cleaned.

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Immediately after spraying, castings are hung on a chain conveyor which carries them through an oven in which the enamel is baked for about 30 min. at 250 deg. F.



ONE of four spray booths in the room where die castings are masked and portions are spray enameled over parts of the plated surface. Beyond the operator is seen the bottom of an oven in which the enamel is baked as castings are carried through it on a chain conveyor.

The enamel is a quick drying type made for the purpose and has excellent adhesion, even on the plated finish over which, of course, it is applied. Ovens are of the type having electric heating units and with top vents through the roof for discharge of spent air. When the enamel is dry and hard, as it is at the end of the oven, castings continue on the conveyor until cool and then are removed and packed for shipment. The spray room alone is designed to handle about 25,000 castings a day or some 3000 lb. of castings per hr.

Except for toting castings received from outside suppliers to the point where processing starts and toting cartons of finished castings to shipping platforms, nearly all handling is done by conveyors. There is thus a substantially continuous flow of parts from the receiving end of the plant to the opposite or shipping end, the whole layout having been made a regular flow in view. Although the plant does a jobbing business, the items handled are primarily those required in large quantities and it is largely this which makes feasible so efficient a layout. At the same time, however, smaller quantities of castings can be and are handled expeditiously though with less use of conveying equipment. All except a very small percentage of the castings handled are in zinc alloy, but in some of the hand tanks some aluminum alloy die castings are

TWENTY-EIGHTH in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

# 41 Lessons in ARC WELDING

—Continuation of a series of lessons to enable beginners to master the fundamentals of bare and shielded arc welding techniques.

ESSON No. 18: Object is to make a horizontal butt weld between two vertical plates. Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is two  $\frac{3}{8}$  x 3 x 6-in. steel plates with a 45-deg. bevel on the end of one, and  $\frac{5}{32}$ -in. diameter Flex Arc welding electrodes.

Instructions: A horizontal butt weld between vertical plates is one of the most difficult welds to make on a vertical surface. A number of joint designs may be used but in all cases they should be proportioned so that the kerf angle on the top plate is not too small. A wide angle single bevel joint, as shown in Fig. 34, is often preferred to the normal single vee joint (Fig. 34) because it affords better fusion to the top plate.

The weld should be made by using a series of string beads. Small diameter electrodes are preferred especially for the first passes. A short arc must be maintained at all times and care taken to prevent roll and overlap. Depositing metal on the top kerf surface approximates overhead welding, consequently special care must be taken to obtain complete fusion.

PROCEDURE: Set the polarity re-

versing switch on straight polarity, adjust the welding current to 150 amp. and tack weld the plates together as shown in Fig. 35. Mount the plates in the vertical position and securely ground them to the welding table.

Deposit the weld by making five string beads in the sequence shown in Fig. 34. Be sure to hold a short arc at all times. When depositing beads 3 and 5, point the electrode upward so that complete fusion will be obtained on the top plate.

After the weld is made have the instructor inspect it for appearance. Following the instructor's inspection, nick the weld and break it. The exposed fracture must show complete fusion and the entire absence of slag inclusions, poor penetration and gas pockets. Repeat this exercise until a satisfactory weld can be made.

ESSON No. 19: Object is to deposit beads of weld metal on an overhead surface. Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is steel plates 1/4 in. thick and 1/8 in. diameter Flex Arc welding electrodes.

INSTRUCTIONS: Welding in the overhead position is one of the most difficult positions in which to weld. The molten deposited metal has a tendency to run or fall downward as a result of the pull of gravity, consequently it requires a great deal of skill to deposit a smooth uniform bead. The major portion of metal transfer from an electrode occurs by the formation of drops, consequently the welding technique must be such as to transfer the molten drops from the electrode to the plate being welded.

Holding a short arc is essential to the deposition of metal in the overhead position. If a long arc is held difficulty will be obtained in obtaining proper metal transfer and in preventing the deposited metal in tending to run downward in the form of drops. The electrode should be pointed at approximately right-angles to the plate or toward the weld at an angle of about 15 deg., as shown in Fig. 36.

Most overhead welding is made in string beads although a slight weaving motion can sometimes be used. Excessive weaving must be prevented because it tends to create a large pool of metal that is very difficult to control in the overhead position.

PROCEDURE: Set the polarity reversing switch on straight polarity, adjust the welding current to 100 amp. and tack weld a plate in the horizontal position so that welding can be done on the underneath side.

- (1) Practice striking the arc overhead until it can be struck and maintained.
- (2) After the art of striking has been mastered, deposit short string beads by holding a short arc. Inspect the beads for smoothness, undercut, etc.
- (3) Repeat the same exercise by holding a medium and long arc and note the difference in the appearance of the beads.
- (4) Deposit a bead by weaving about ½ in., using a crescent-shaped weaving motion.
- (5) After it is possible to make a uniform bead in the overhead position, make a test piece as shown in Fig. 37.

LESSON No. 20: Object is to make a butt weld in the overhead position. Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is two  $\frac{3}{8} \times 3 \times 6$ -in. steel plates with a

45-deg. bevel on one end of each and  $\frac{1}{8}$ -in. diameter Flex Arc welding electrodes.

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Instructions: The deposition of a butt weld in the overhead should be made by depositing a series of string beads as outlined in Lesson No. 19. When the joint becomes wide, a slight weave may be used but this is not recommended for the beginner. A short arc must be held to obtain proper metal transfer and to make a smooth uniform bead. If the beads are rough it is advisable to chip the rough surface off, otherwise poor fusion and slag inclusions will be obtained.

The most difficult task in making an overhead butt weld is to obtain complete fusion with the first pass without burning holes in the thin edges of the plates at the root of the weld. Periodically lengthening the arc when the metal appears to get too hot will greatly aid in preventing the burning of holes.

PROCEDURE: Set the polarity reversing switch on straight polarity, adjust the welding current to approximately 100 amp., and tack weld two 3/8-in. plates together to form a 90 deg. single vee butt joint. Mount the plates in the horizontal position so that they can be welded in the overhead position.

Weld the plates together by using five passes, as shown in Fig. 38. Hold a short arc and take special care to make uniform beads free from undercut. Clean each bead before depositing the next. Chip all welds that are not smooth. After the welded joint is completed have the instructor inspect it. Following the instructor's inspection, nick the weld and break it, Repeat this exercise until a weld free from gas pockets, slag inclusions, poor fusion and incomplete penetration can be obtained.

ESSON No. 21: Object is to make a fillet weld in the overhead position. Apparatus used is Westinghouse Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is two 3/8 x 8 x 6-in. steel plates, and 1/8-in. diameter Flex Arc welding electrodes.

INSTRUCTIONS: Fillet welds may be made in the overhead position with the plates in the horizontal and vertical position or with both plates positioned at an angle of 45 deg. with the horizontal, as shown in Fig. 39.

A fillet weld made with plates

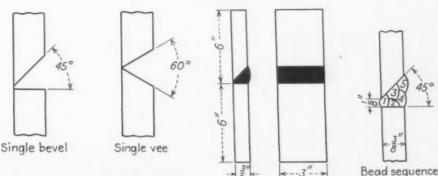


FIG. 34—Types of joints used for a horizontal butt weld between two vertical plates.

FIG. 35—Technique to follow for a horizontal butt weld between two vertical plates.

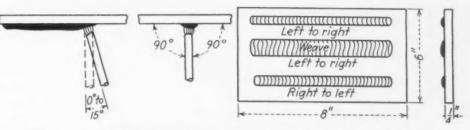


FIG. 36—Method of pointing electrode to deposit beads of weld metal on an overhead surface.

FIG. 37 — Test procedure followed for overhead surface.

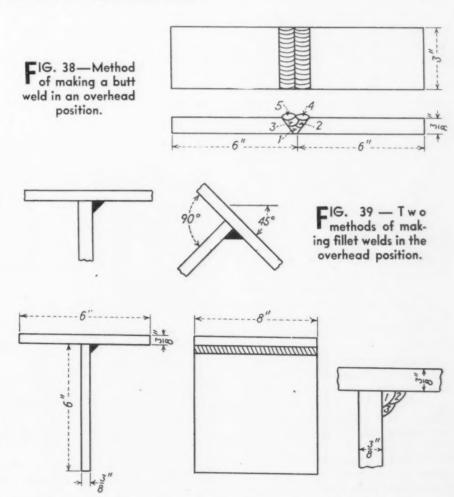


FIG. 40—Technique to follow for making a fillet weld in the overhead position.

positioned at an angle of 45 deg. is similar to a butt weld, consequently it will not be considered separately in this course. Also fillet welds on lap and tee joints are made in the same manner, consequently only the tee welded joint will be considered in this lesson.

Overhead fillet welds are generally made in a series of string beads similar to the method discussed for overhead butt welds.

PROCEDURE: Set the polarity reversing switch on straight polarity, adjust the welding current to approximately 100 amp. and tack two 3%-in. plates together to form a 90 deg. tee joint, as shown in Fig. 40. Mount the plates as shown in Fig. 40 so that a fillet weld can be made in the overhead position. Use three beads to make the weld. Hold a short arc at all times and clean the weld between passes. Chip

the deposits when necessary to insure sound fusion and freedom from slag inclusions.

After the instructor has inspected the finished weld for appearance, fracture the weld. The weld must show complete penetration and be free from gas holes, slag inclusions and poor fusion.

Repeat this lesson until a satisfactory weld can be made.

# Multiple Spot Welders Speed Production

THE increased application of Stran-Steel members for building and light construction purposes has led to the development of new multiple-spot welding machines by the Progressive Welder Co., 3017 East Outer Drive, Detroit. These machines, capable of a combined production of 2400 lineal ft. of steel members, were recently placed in operation at the Jackson plant of the Stran-Steel Corp.

Previously riveted and later spot welded by means of a single spot machine, the entire line of Stran-Steel joists, studs, half studs, and narrow studs of light gage copper bearing steel is first formed into angles or channels and then so joined as to provide a nailing space along the entire length of each member. The projection formed by bubbles stamped at regular intervals along one half of the completed section provides this nailing space.

Two identical machines each employing 12 vertically opposed sliding contact guns and six welding transformers (one for each spot weld made) are used. An airhydraulic booster with a large reservoir and high pressure capacity supplies sufficient pressure for the simultaneous operation of the 12 guns.

To accommodate any of the various width Stran-Steel members, provision is made for adjustment as to distance between guns on each side. Guns may be moved also for the proper spacing between spots longitudinally. This together with the provision made for cutting out the guns on either side (permitting the machine to be used for welding the half stud members) makes each machine capable of welding any of the Stran-Steel sections.

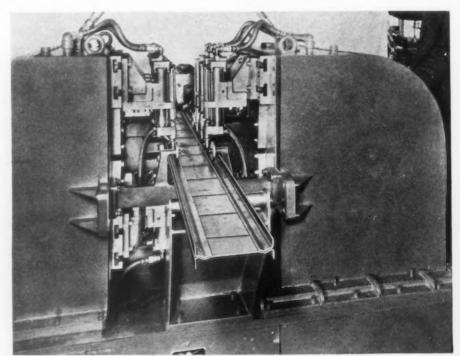
Since the different gages of metal require different welding pressure, weld time, and welding current, provision for adjustment of each is made.

Sizes handled vary from about  $2\frac{1}{2}$  and  $3\frac{1}{2}$  in. web width to 9 in. for the joist. Half studs, made up of two angle sections and welded with one set of guns only, are about 2 in. overall in web width.

One set of small rolls mounted inside the two rows of guns supports the work midway between the upper and lower welding points. These rolls also serve to locate the position of the spot welds which are made through each bubble in the member. Another set of rolls positions the work laterally.

When the work is placed in the welding machine, the section having the bubbles is on the under side. As the part is moved through the machine, these bubbles drop onto the rolls thus positioning the work for welding.

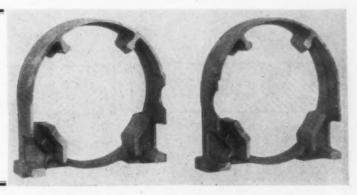
Assembly of the sections preparatory to welding is done by the welder's helper who places the angles (in the case of the joists) in position and clamps them. The clamped assembly, usually measuring some 30 ft. in length, is then started through the welding machine. The section is pushed through until the first bubble on each side of the section is in position at the first welding gun station, a weld is made and the C-clamps removed.



A TOTAL of 2400 lineal feet of Stran-Steel framing members per hour can be spot welded with this "Progressive" machine which employs twelve vertically opposed sliding contact guns short-coupled with six transformers mounted in the base and sides of the machine.

# "Book" Molding With Green Sand Cores

THE method of "booking" core halves is not new, and as a rule this process has been used on fairly simple types of foundry work. To adopt this system of molding to motor frame castings with intricate coring and to do it successfully on a production basis, however, is a real accomplishment.—Editor.



SECTION of the new G-E Tri-Clad motor frame, showing the relatively thin sections successfully employed for the outer shell.

HEN General Electric Co. set about to develop its new line of Tri-Clad polyphase induction motors, one of the problems was to design a frame casting having maximum strength, minimum weight, adequate protection for the motor winding, means for supporting the stator punchings, suitable air passages for ventilating the motor and a pleasing ap-

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By E. H. BALLARD

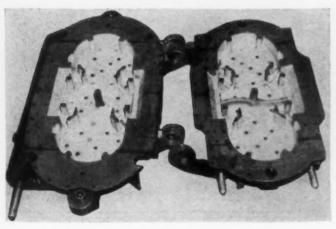
Foundry Superintendent, River Works, General Electric Co., Lynn, Mass.

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pearance along modern, clean-cut lines.

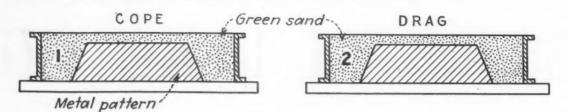
To obtain a gray iron casting of maximum strength with economy of material in a simple form, it was decided to make the frames with circular flanges around the ends and cross bars between the flanges for supporting the punchings. To give suitable air passages holes are needed through the cross bars or spaces behind the bars. For minimum weight, the outer section thickness had to be held to a minimum and concentricity held within small limits. Protection and pleasing appearance called for a smooth outer shell with the parting line in a vertical plane in the middle of the casting in its operating position. In molding, this parting line is in a horizontal plane since the motor frame is cast on end. In addition, the feet required special treatment to insure adequate strength and good appearance.

In the early stages of the design the foundry engineers were called in as it was obvious that some innovations in casting practices would be required if the specifications were to be met at an economical cost. Considerable study was given to the problem of coring

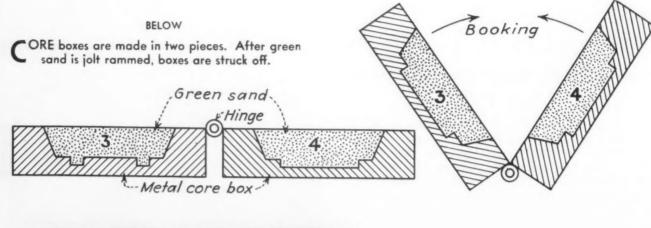


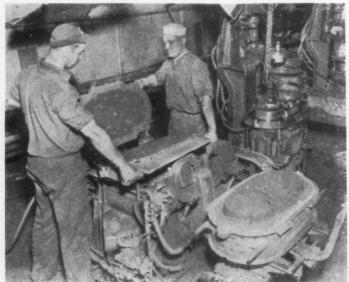
METAL core
equipment
used in the booking
process. The boxes
are split on the horizontal center line
and are hinged at
the side so that
after molding is
completed the two
halves may be
folded up into each
other, simulating
the action of closing an opened
book.

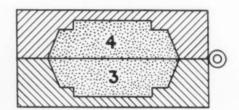
THE IRON AGE, March 27, 1941-53



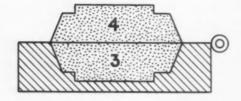
COPE and drag molds are made in the conventional way, coordinated with the core machine operation.



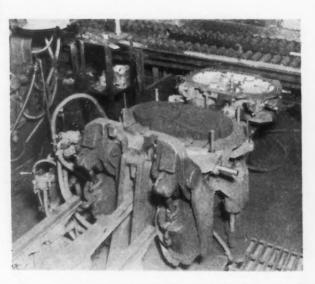


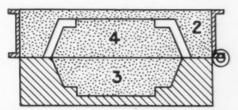


THE two core box halves are "booked" by hand (i.e. folded up together as shown above and rolled down onto the jolt table). Photograph at left illustrates actual booking operation.



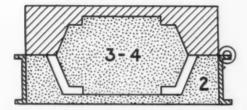
U PPER half of core box is vibrated and lifted off and replaced on jolt table, leaving lower half box with complete core. Corresponding photograph is at right.





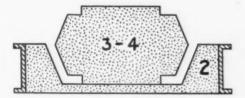
BY special guide pins, lower half of core box now receives the drag mold and the two are automatically clamped together. Lowering of drag is shown at right.





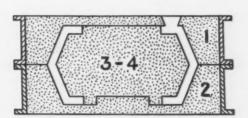
DRAG mold and lower core box are rolled over onto leveling table, clamps released and core box raised from drag and rolled back into original position.



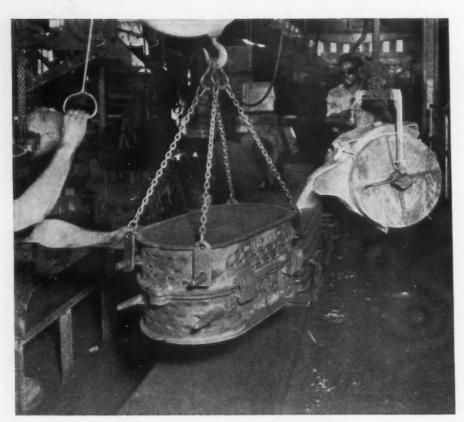


DRAG is left with green sand core in place. Photograph at right shows core box being rolled back into initial position.





C OPE half is placed on drag, is clamped with tapered slip clamps (left) and is deposited on mechanical mold conveyor for pouring.



OLDS are poured on a power driven conveyor and hot metal is delivered to them from an insulated ladle suspended from a monorail.

since core shifting had to be eliminated as a source of error if the amount of rejected castings was to be kept at a minimum within the narrow limits of thin wall sections selected. To solve this molding job, a wooden model was made that materially assisted the designing engineers, pattern shop supervisors and foundry men in arriving at the final design which was approved by all interested parties. Too much emphasis cannot be placed on the advantages obtained from study of molding problems by the use of models.

Finally, after a great deal of study and experimental work done by the use of inexpensive hand patterns, a method of producing frame castings without the use of dry sand cores was proven and a modified method of making green sand cores as a part of the whole molding function was devised. The next step was securing suitable molding machines by means of which the original cost estimates could be met. Obviously, no standard machines were available, so it became necessary to have special machines built that would duplicate the molding operations developed by the hand pattern experiments. This special core molding machine is a combination of double jolt ram tables and single roll-over unit of the flask draw type. The molding machine is a cope and drag jolt ram, squeeze strip type. Pattern equipment consists of all-metal patterns and core boxes, the smaller frame sizes being made two in a flask and the larger sizes, one per flask.

The sequence of operations is shown in the series of sketches and some of the more significant steps are illustrated by photographs. The term, booking process, derives from the fact that the two green sand core halves are molded separately and then are closed simultaneously in a vertical plane just as one would close a book.

In passing, it should be mentioned that extreme accuracy of pattern and core boxes, with drafts of 1 deg., resulted in producing castings practically free from fins and with clean-cut cored openings. Rigid cast steel flasks were designed to fit the various patterns and these have cross bars cast integral, eliminating the need of mold follow boards.

A continuous sand system serves two groups of three molding machines, which are all hopper fed, with spillage return. The sand system is under the control of one man who checks the condition of the sand hourly so as to maintain close limits as to permeability, green strength and moisture content. Likewise, the metal from which these frames are produced is under constant control in order to produce a uniform high grade casting.

Molds are poured on a mechanical conveyor and hot metal is delivered to them from an insulated ladle suspended from a monorail. After being poured, the molds pass into an exhausted cooling tunnel and thence to the shakeout, which is also exhausted. As flasks reach this point, they are pushed from the conveyor onto the shakeout by an air operated ram. Castings are vibrated onto a flight conveyor which transfers them to a cooling shed outside the foundry proper.

THE new G-E line of Tri-Clad polyphase induction motors has called for many new methods in motor manufacturing, including an improved method of making green sand molds by the socalled "booking" process, described in this article.

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MACHINE TOOLS
FOR DEFENSE

### RIGHT

FOR some defense jobs the horizontal boring, milling and drilling machine is literally enthroned. This view shows a Cincinnati Gilbert sliding table type boring mill installed at the Spicer Mfg. Co. for work on aluminum alloy transmission cases for light tanks. Operations are to spot face two bosses for idler gears and drill and ream idler shaft holes, as well as certain minor operations. Sliding table is special as is the work holding fixture. The platform and steps facilitate loading and clamping of the work and observation of the cut.

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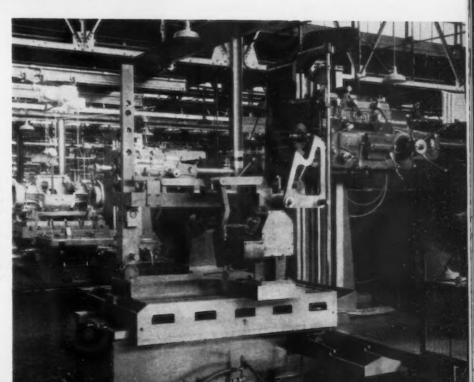


### LEFT

ANOTHER Cincinnati Gilbert sliding table type boring mill at the Spicer plant, with an angular type fixture for supporting the aluminum transmission case. On this machine, which has 48 in. vertical head travel and 60 in. horizontal travel of column, the following operations are performed: Milling cover face, milling brake bosses inside and out, and milling bearing caps on the inside as well as on the sides.

# RIGHT

THE sliding table type Gilbert horizontal boring mill is equipped with a special fixture which can be adjusted to various angles for operations such as milling, drilling, reaming, etc., performed on the aluminum transmission case of light combat tanks. For working in aluminum, the mills shows are being operated at about 200 ft. per min. cutting speed, with feeds varying from 0.018 to 0.035 in. per rev. Depth of cut varies from 1/4 to 5/16 in. Spindle speeds on these machines range from 24 to 1420 r.p.m.



# Gas Technicians Discuss

ITH over 300 industrial men in attendance, the Conference on Industrial Gas Sales, sponsored by the Industrial and Commercial Gas Section of the American Gas Association, held last week in Baltimore, was one of the most successful since these conferences were initiated in 1936 at Chicago. Particularly interesting were several original research and developmental projects reported on for the first time.

One very informative paper was that presented by Carl P. Mann, of the Selas Co., Philadelphia, dealing with "Gas Fuel for Short-Cycle Curing of Industrial Finishes." The facts presented by Mr. Mann applied only to polymerized finishes, as oxidizing and volatilizing finishes are not suited to short cycle curing. And, by short cycle he had reference to curing times of less than 30 min.

The one fundamental fact emphasized by Mr. Mann, and the cardinal point to be kept in mind in all consideration of curing finishes, is that the curing of a finish is directly dependent on heating the work piece, and only in the degree that any curing process accomplishes this, will that process be successful.

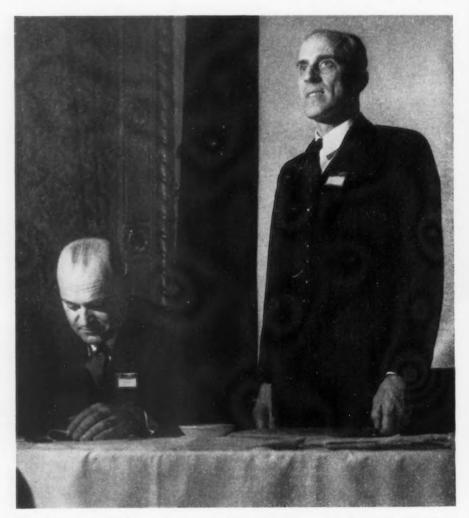
Gas fuel may be applied in the form of convection heating, infrared ray radiant heating, or by a combination of both, and the selection of the proper application to be used in any particular instance can be made only when its specific requirements have been analyzed in the light of the known advantages and limitations of each method of applying gas fuel.

As these advantages and limitations were discussed in relation to the characteristics of the work pieces, it might be best first to examine the forms of these pieces. Are they regular or irregular in shape? Are they large or small? Is the surface polished or rough?

Are the pieces thin or are they thick? Is there a variety of colors in the finishes or are they all one color?

Taking these factors in order, Mr. Mann examined how each affect the proper selection of heat application, and while the primary interest was in the application of gas fuel alone, yet incidental comparisons with other energy sources were made.

Irregularity of shape has no influence on convection heating, but in radiant heating it is important that no part of the work pieces cast a shadow over a finished part. Shadows inhibit the heating of the work piece at that point, consequently retard the curing process, while the unshadowed parts of the work pieces cure normally. It is of equal importance that the rays strike all finished surfaces at ap-



CARL P. MANN, manager of drying division, and Frederic O. Hess (seated), president, the Selas Co., Philadelphia, who reported at the 1941 A.G.A. Conference on Industrial Gas Sales on original research investigations concerning, respectively, (1) the short-cycle curing of industrial finishes with radiant and convected heat, and (2) new developments in applying direct radiant gas heat to high quality ceramic firing.

# Year's Developments

-Short cycle curing of industrial finishes and production of shells and guns feature recent conference in Baltimore.

proximately the same distance from the radiant source, as the effectiveness of infra-red rays is very much influenced by the distance between the work piece and the energy source. For instance, increasing this distance between the energy source and the work piece from 6 in. to 10 in. increases the curing time from 150 per cent to 500 per cent depending on the kind of finish being used.

If the work pieces under consideration are large and regular in shape, and all pieces are the same, then radiant sources may be located to give uniform curing to the finish, but if the pieces are small, and if many must be grouped in the oven at the same time, it may be impossible to arrange the radiant sources to give uniform curing.

In this connection it is desirable to point out that if radiant sources are located beneath the work piece in order to minimize the shadow effect, their effectiveness may be decreased due to dripping. Also, the effectiveness of infra-red ray lamps, but not radiant gas burners, will be decreased by the vaporization and condensation of solvents on the lamps and reflectors. Convection heating is entirely free of these disadvantages, according to Mr. Mann.

Polished or unpolished metal surfaces under finishes do not affect curing time with convection heating, but in the case of radiant heating a polished surface will require approximately 20 per cent more time for curing than an unpolished surface, if radiant gas burners are used, and if infra-red ray lamps are used the increase in curing time may vary from 9 per cent to 45 per cent, depending on the type and color of finish, said Mr. Mann.

Having in mind the fact that basically, curing of a finish is directly dependent upon increasing the temperature of the work piece, it is obvious that the thicker the piece the longer will be the curing time. Irrespective of the method of curing, the longer the curing time for any shaped piece, the less will be the percentage increase in curing time due to an increase in the thickness of the piece. For instance, in radiant heating where there will be a 55 per cent increase in time due to doubling the thickness of a piece which has a curing time of approximately 3 min., there will be only a 36 per cent increase in time due to doubling the thickness of a piece which has a curing time of approximately 8 min. In convection heating, where there will be a 35 per cent increase in time due to doubling the thickness of a piece which has a curing time of about 1/2 min. there will be only an 8 per cent increase in time due to doubling the thickness of a piece which has a curing time of about 61/2 min.

The color of a finish has no effect whatever in the curing time of a piece where convection heating is used, but one of the outstanding characteristics of radiant heating is the fact that, other things being equal, different colors of finishes require different curing times. Black will require the shortest curing time, and white the longest curing time, while other colors require intermediate times periods for curing. And, what is of special significance is the fact that in comparing gas radiant heat with infrared ray lamps, the variation in curing time with different colors is much more pronounced with infrared ray lamps than with radiant gas burners. As an example, there will be an increase in time from 4.9 min. for black to 5.7 min. (or 16 per cent increase) for a white finish using gas radiant heat, while for the same piece and the same finishes there will be an increase in time from 12.55 min. for black to 38 min. (or 204 per cent increase) for a white finish, using infra-red ray lamps. This characteristic is of great importance where a variety of pieces of different colored finishes are being cured, or where each piece has a finish consisting of two or more colors, because in order to prevent overcuring of dark finishes the formulation of the several finishes must necessarily be made such that the curing time with infra-red rays will be approximately the same for all colors. This means, according to Mr. Mann, that a variety of formulas must be maintained where infra-red ray curing is used, which would not be necessary with convection heating. This, of course, is very undesirable.

It is natural to draw the conclusion that increasing the amount of heating energy supplied by any method of curing will decrease the curing time. With the convection or radiant gas burner methods of heating, the percentage decrease in curing time is much greater than that of infra-red ray lamps. The explanation for this lies in the fact that the heating up rate of the work piece increases much more with the increase in temperature of convection or radiant gas burner heating, than with infra-red ray lamps.

Up to this point Mr. Mann's discussion was confined to the physical

aspects of work pieces and how these affect the selection of the curing method to be used; and as already stated, the importance of these considerations must not be overlooked in solving the problem of curing finishes, but the final selection of any curing method will depend equally on the economic consideration of the problem, i.e., the cost of the necessary equipment for curing, the rate of production for any given space (or conversely the space required to produce the required number of pieces at a given rate) and finally the operating costs of the methods under consideration. Too often hasty conclusions are drawn based on superficial facts. Frequently decisions must be made rapidly, and in times like the present, under the stress of great pressure, so it is advisable that the most pertinent points of a problem be first selected, and the problem analyzed and clearly presented as viewed from these points.

The actual cost of equipment for any proposed installation must be estimated when the requirements of the design, character of work pieces, and necessary safety precautions are known. Any specific statement making a direct comparison between the costs of the several methods of curing would be misleading.

In the matter of design due consideration must be given to the fact that convection heating installations require from 15 to 30 min. heating up time before being ready for operation, whereas infra-red ray lamp installations are ready for operation immediately, and radiant gas burner installations almost immediately upon starting. Then, due to the rapidity with which convection heating acts on the finish it is necessary to provide for a 1-min. preheat period in the design of the oven. This can be advantageously accomplished by the exchange of heat from the cured pieces at the discharge end to the entering pieces at the feed end. This eliminates any additional heat for preheating, prevents accumulation of solvents, and cools the cured work pieces, a desirable feature as it facilitates handling for inspection and otherwise. Any curing installation should provide for this, but the figures included in Mr. Mann's presentation did not include the necessary power for providing the cooling in circulation.

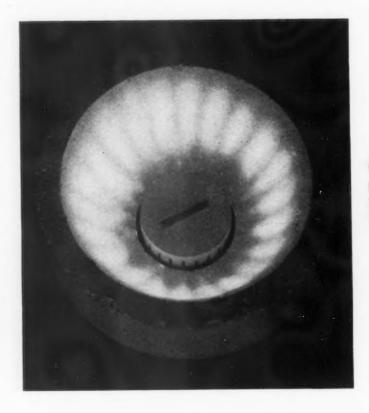
It was also pointed out by Mr.

Mann that the only way of utilizing exclusively the infra-red rays from a radiant gas burner is to interpose a glass barrier between the work piece and the burners, as was done in the series of tests on which his paper was based. This is, of course, undesirable, in most cases impractical, and furthermore unnecessary, because by the elimination of the glass barrier a method of curing is obtained which combines both radiant and convection heating, leading to a most advantageous curing method.

The fact that infra-red ray lamp installations are less expensive and somewhat less complicated in operation is a point easily stressed and a point which invariably finds receptive ears, but when the production capacity of such an installation is compared with that of convection heating other important facts are uncovered. On the basis of the same length of oven, an infra-red ray lamp installation using 375 watt lamps, and no preheat, producing 253 pieces per hr. will, if converted to convection heating, circulating air at 400 deg. F. and allowing a 1-min. preheat, produce at the rate of 1480 pieces per hr., or nearly six times that of the infra-red ray lamps; and if radiant gas burners are used without the interposition of glass barriers, this rate of production will be 2260 pieces per hr. without any preheating period, according to Mr. Mann.

Now all these figures are subject to variation, the temperature of the air in convection heating may be increased, or the wattage of the infra-red ray lamps may be increased, but as already pointed out, in this zone of temperatures and wattages the percentage gain in production for the same percentage gain in energy input is very much greater for convection heating than for infra-red ray lamps. However, the cost of production will be affected. For instance, making a comparison of the operating costs, using the pieces in the above example as a basis, and including the power cost of running motors in convection heating, which would not be included with infra-red ray lamps; and furthermore taking a gas rate of \$1 per 1000 cu. ft. manufactured gas and a power rate of 2c. per kw. hr., it is found that the cost per 1000 pieces with infra-red ray lamps is \$1.42, with convection heating is 21c. (or less than 1/6 of of the cost) and with radiant gas burners, minus glass barriers 47c.

These cost figures were obtained by Mr. Mann at the hourly rate of production mentioned above, namely 253 per hr. for infra-red ray lamps, 1480 per hr. for convection heating, and 2260 per hr. for radiant gas without barriers. If these operating cost figures are put on the really comparable basis of cost per 1000 pieces per unit of time, (which would mean, for instance,



CERAMIC 3-in.
radiant gas
burner for drying
industrial finishes.
Made by the
Selas Co.

increasing the electric energy input, or extending the lamp banks and increasing the rate of feed of the work pieces) these unit costs would be \$8.30 for infra-red ray lamps, 21c. for convection heating and 31c. for radiant gas burners without barriers.

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These comparative figures presented by Mr. Mann show the efficiency of gas fuel in the short cycle curing of industrial finishes, except in some isolated cases or where unusual circumstances prevail, as for instance in cases where turbulence is detrimental. And, as an additional sidelight on the matter, it was pointed out that the polymerizing types of finishes are not unfavorably affected by the products of gas combustion, consequently convection heating equipment may be direct gas fired. This produces more efficient equipment at smaller cost and should be kept in mind in making comparisons where oil fired equipment is being used or considered.

# Shell and Gun Production

Another interesting paper was that presented by F. Coleman Starr, of Surface Combustion Corp., Philadelphia district, which was concerned with "Uses of Gas in the Production of Munitions, Particularly Shells and Guns for Aerial Warfare."

Mr. Starr stated that the Surface Combustion Corp. is now working on a large volume of industrial furnace orders, over 90 per cent being for the Defense Program, a great percentage of these furnaces will be heated with gas.

The following list presented by Mr. Starr covers furnaces designed or built or under construction for guns, shell and shell cases of 5 in. caliber and the smaller sizes. It does not include some of the other very important industrial gas applications such as heat treatment of tools, gas carburizing of light armor, heat treatment of aircraft engine cylinders, aircraft tubing, propellers, etc., etc.

In bracketing the different types of furnaces necessary for the production of ammunition and guns for aerial warfare, it is possible to arrive at several general groups. These are as follows:

- (1) Projectile furnaces.
- (2) Shell case or cartridge case furnaces.
  - (3) Gun barrel furnaces.



COLEMAN STARR, Surface Combustion Corp., Philadelphia.

(4) Furnaces for gun mounts, carriages, etc.

These classifications may be still further broken down into the various units needed for the processing of the material from rough stock to finished product.

Under the heading "projectile furnaces," are found the following heat treating operations, together with the types of furnaces now in use for the particular operation.

- (1) Projectile forging furnaces.
  - (a) Rotary.
  - (b) Pusher.
  - (c) Conveyor.
  - (d) Batch-type (in and out).
- (2) Projectile nosing.
  - (a) Rotary.
  - (b) Batch.

- (3) Projectile normalizing.
  - (a) Walking beam.
  - (b) Pusher.
  - (c) Rotary.
- (4) Projectile hardening and drawing.
  - (a) Walking beam.
  - (b) Pusher.
  - (c) Rotary.
  - (d) Conveyor.

When considering the cartridge or shell cases used in anti aircraft or aircraft ammunition, a group of annealing furnaces of different types and sizes are found. Starting with a blank or cup, the piece is subjected to a series of draws and finally a nose tapering operation to form the finished case.

For instance, on one type of 37 m.m. shell case, there are four annealing operations before the piece is ready for tapering. There are then two heat treatments in a liquid furnace to permit tapering and mouth annealing, and finally a low temperature stress relief.

The pieces are usually water quenched after each anneal, and this operation can be built into a continuous furnace or performed in an outside quench tank in baskets or some other sort of containers.

The types of furnaces which are in use for heat treating cartridge cases may be listed as follows:

- (1) Conveyor chain.
- (2) Conveyor flight.
- (3) Pusher.
- (4) Batch—vertical or horizontal.
  - (5) Salt bath for tapering.

In the production of gun barrels for anti-aircraft armament, the following operations and the accompanying furnaces may be listed.

- (1) Forging furnaces.
  - (a) Generally in-and-out batch furnaces, but with sufficient production, continuous furnaces could readily be justified.
- (2) Quenching furnaces.
  - (a) Preferably vertical pit type.
- (3) Draw furnaces.
  - (a) Vertical or pit.
  - (b) Car type-direct-fired or convection.
- (4) Stress relieving furnaces.
  - (a) Vertical or pit.
  - (b) Car type, preferably convection.

With reference to anti-aircraft gun mounts, gun carriages, bases,

etc., nearly all of this equipment is built up of shapes, plates and structural members and is completely welded wherever possible. All of these assemblies have to be stress relieved and a very great percentage of the furnaces are designed for convection heating. The design and size of the furnace of course depends on the nature of the piece but the following types are in use:

- (a) Pit type or vertical.
- (b) Carbottom.
- (c) Horizontal batch in-andout.

In considering the above list of furnaces two points were emphasized by Mr. Starr. First—each classification does not represent just one furnace in operation or under construction, but many furnaces, varying greatly in size and productive capacity. Second—every type of furnace listed and every heat treating operation, with the possible exception of forging antiaircraft gun barrels, is properly a gas-fired job.

Within the limits of Mr. Starr's paper, it was, of course, impossible to discuss the details of each of the various types of furnaces referred to above. It is possible, however, to pick out one or two jobs which, because they combine good furnace engineering with a proper fuel application, were of special interest.

Considering first the projectile furnaces, it is possible to bracket anti-aircraft ammunition in sizes from 4.5 in. to 5 in. diameter shell down to 50 caliber machine gun bullets. For the forging or subsequent heat treatment of the larger shells in this group, a number of very satisfactory gas-fired rotary furnaces have been built. One of these furnaces for instance has the following specifications:

The outside diameter of the furnace casing is 23 ft. The rotating hearth is 3 ft. wide with a mean diameter of about 17 ft. The hearth is built up of fire brick piers, capped with alloy plates. This unit has a capacity of 8000 lb. per hr. of airplane engine cylinders or

shells and a temperature range from 800 deg. F. to 1800 deg. F.

One interesting feature of this furnace is that seals are eliminated. The furnace pressure in the three zones is automatically controlled and there is no apparent leakage of air into the furnace nor outward flow of gases, either at the full firing rate or when holding.

Another type of furnace which can be adapted to cover a wide range of heating operations is the unit embodying a cast alloy belt conveyor. This unit fits into the projectile furnace group and is also very satisfactory for annealing cartridge cases and shell cases for anti-aircraft and anti-tank ammunition.

In this furnace a cast alloy conveyor is totally enclosed—in other words, a "hot" belt which eliminates the loss of efficiency of a convevor which runs over an outside drum either at one or both ends of the furnace. The conveyor can be charged in several ways, one of the most effective being a shaker hearth type of mechanism which enters through a slot in the end wall and distributes the product evenly and at a uniform rate on the moving belt. At the discharge end, the pieces drop off the conveyor into a quench tank, either water or oil, and on to a quench tank conveyor suitable for the work.

The specifications on one of these units designed for heat treating 30 and 50 caliber cartridge cases are as follows:

The furnace is about 27 ft. overall length and 8 ft. wide. It is designed to operate in a temperature range from 750 deg. to 1400 deg. F. maximum, and has a capacity of 4500 lb. per hr. It is direct-fired with low pressure burners over and under the work and there are two control zones. This type of furnace, except for the small charging slot is completely air and gas tight. There are several ways of sealing the charging slot, and it is evident that this design lends

itself perfectly to atmosphere control.

Referring to the third general group, "gun barrel furnaces," Mr. Starr described a typical heat treating set up without going into details of temperatures, cycles, etc. The gun barrels for anti-aircraft guns from 3 to 5-in. caliber are forged from blanks and rough-machined before the quenching operation

The quenching furnace is a vertical pit type unit from 25 to 30 ft. deep and about 9 ft. inside diameter. The gun barrels, singly or in groups of two, three or four are hung from a special fitting or spider. This may be handled with the furnace cover or separately, as desired.

The furnace is direct-fired with either high or low pressure burners which are applied to insure the most uniform heat input and distribution. There are at least three, and preferably four vertical zones of control.

After quenching, the gun barrels are lowered into a draw furnace, usually pit type and, in some instances, the same furnace is used for drawing and quenching. While this can be done, it is obvious that at the usual draw temperatures, a direct-fired unit is not as efficient as the convection type, nor can the same uniformity of temperature be obtained.

After drawing and finishing machining, the gun barrels are then stress relieved in a low temperature convection furnace. This is usually a car type or horizontal batch type furnace because, at the temperatures involved, the gun barrel may be supported horizontally without fear of bending.

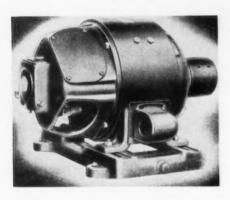
The last general group of furnaces for gun mounts, carriages, etc., are all, or should be, convection heated units. They may be match-type, or pit type or car-type at discretion, and they will be highly efficient and entirely satisfactory if the heating application is properly engineered.

# New Equipment...

# Motors and Controllers

In this week's review of equipment we discuss advances in electrical motors, in switches, circuit breakers, starters, instruments and cables.

OMPACTNESS and improved protection are the two outstanding features of a new line of d.c. motors recently announced by the General Electric Co., Schenectady, N. Y. The rolledsteel frame and the improved endshield and bearing bracket are designed to give the motors excellent protection from external damage. Formex wire coils and a special varnish insulation provide high resistance to impact, abrasion, and the action of foreign materials. These motors, fitted either with sleeve or ball bearings, can be reversed without changing any parts



of the frame, fan or brush rigging, and have Textolite wedges in the armature slots to protect the windings. They can be supplied in a variety of sizes for constant or variable speed application and rate from ½ to 60 hp. In the larger models the design embodies self-ventilation and extra protection.

### New Series of Motors

OPEN type squirrel-cage induction motors designed especially for general purpose industrial and machinery drive applications are announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh. These type CS motors are available in ratings from ½ to 5 hp., at speeds from 875 to 3600

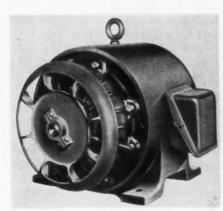
r.p.m., for operation on 110 to 550 volts, 2 and 3 phase a.c. The new motors are attractive in appearance, compact and mechanically strong. Rigid cast frames maintain constant air-gap between stator and rotor, assuring high efficiency of operation. Motors can be had with either sealed sleeve bear-



ing with a large oil reservoir or permanently sealed double row ball bearings. Wire insulation gives maximum dielectric strength. Windings are protected against abrasion and full voltage starting.

# **Enclosed Fan Cooled Motors**

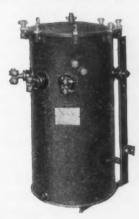
CENTURY totally enclosed fan cooled motors have been improved in appéarance and internal design. These motors are well protected against air, foggy with metal cutting solutions, or air filled with dust of metallic or abrasive par-



ticles which would ordinarily clog or injure the windings of a general purpose open motor. A generous quantity of cooling air is forced through the large air passage by the non-sparking fan, making for a cooler motor with cleaner air passages. These are not easily clogged yet are designed so that a 5/16-in. rod will not pass through. The motors are built by the *Century Electric Co.*, 1806 Pine Street, St. Louis.

# Flame-Protected Transformer

AGNER ELECTRIC CORP., 6400 Plymouth Avenue, St. Louis, announces a new type transformer known as the Wagner Noflamol transformer. Noflamol is a non-inflammable synthetic liquid developed as an improvement over regular transformer oil. Because of the non-



inflammable characteristics of Noflamol, these transformers can be installed indoors without the use of fireproof vaults. In addition to this saving on installation expense, savings are effected by dividing the circuit into several sections and placing a Noflamol transformer at the center of each, eliminating long runs of copper, reducing line losses and improving voltage regulations.

# **Explosion-Proof Motors**

VERTICAL electric motors are built by U. S. Electrical Motors, Inc., Los Angeles, which are claimed to be accepted by underwriters for locations where flammable volatile liquids, highly flammable gases, mixtures or other



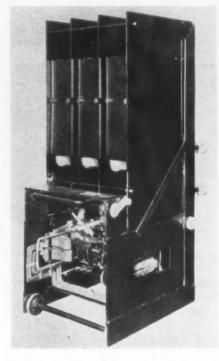
flammable substances are present and for locations where combustible dust is present as in metal powder and coal pulverizing plants. The unit is fan cooled and has asbestos protected windings, which are especially important, as explosion-proof motors are rated 55 deg. C. rise, or 37 per cent higher than standard motors. These motors are offered with a variety of mounting flanges and, regardless of the design of the machine, a mounting bracket is available to fit it without additional adaptors or plates.

# Heavy Duty Circuit Breakers

OR the protection of heavy cir-For the protection of house has developed the De-Ion air circuit breaker type DH. This solenoid closing apparatus is designed for 100,000 to 250,000 kva., 600 to 2000 amp. and 2500 to 5000 volts. 60 cycle three phase a.c. main contacts are silver to silver, arcing contacts are of a special tungsten alloy. High voltage and control circuits are well isolated and the magnetcoil De-Ion method of arc quenching is applied. The circuit breaker is ideal for locations which are closed at the rear, and contacts can be reached by the removal of a lightweight arc chute. Barriers for the isolation of live phases suppress the residual arcing flame and muffle the noise.

This De-Ion type of circuit breaker is also produced in smaller models, type AB-1 for the protection of light and power circuits rating from 15 to 600 amp. and voltages from 250 a.c., 125/250 d.c. to 600 a.c., 250 d.c. The unit is enclosed in a dust and water tight steel case which takes up very little room. For hazardous locations special models are produced.

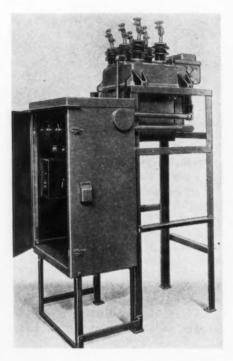
In the Westinghouse Quicklag circuit breaker a single unit combines thermal and magnetic trip



action for the interruption of overloads. On light overloads the magnetic element is not sufficiently strong to influence the armature, and tripping is accomplished by the bi-metal alone. A spring gives quick action make and break-if a serious overload occurs this will only take 1/240th of a second.

### **Automatic Reclosing Equipment**

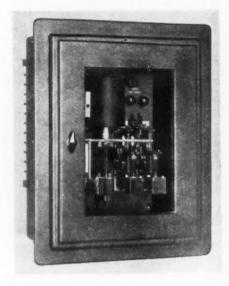
S TANDARDIZED automatic reclosing equipment for use with small outdoor oil circuit breakers of from 50,000 to 250,000 kva. interrupting capacity, 4-600 amp. at 7500 volt and 6-1200 amp. at 15,000 volt a.c. is announced by the Westinghouse Electric & Mfg. Co. This apparatus was designed to meet the overwhelming majority of cases where formerly made-to-order apparatus was necessary. This apparatus utilizes the RC recloser and includes breaker accessories, as



current transformers, breaker trip coils, rectox, etc., and is used in conjunction with the Westinghouse FO-22-A and GO oil breakers.

# Voltage Regulators

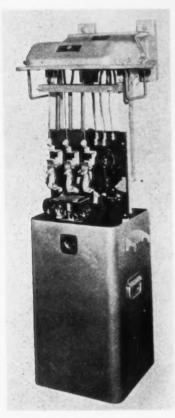
NEW indirect-acting rheosta-A tic generator-voltage regulator, designed especially for the automatic voltage control of medium and large size a.c. generators on quick-response excitation systems improves the stability under fault or large load conditions. The action time of this new type BJ regulator, produced by Westing-



house Electric & Mfg. Co., East Pittsburgh, is three cycles after voltage change. The regulator element responds to average threephase voltage. There are no continuously rotating parts, and means is provided so the regulator characteristics can be adjusted to match those of the generating equipment. Sensitivity is  $\pm \frac{1}{2}$  per cent of normal voltage. A regulator for small generators also has been announced by Westinghouse, the Silverstat Junior, to replace hand manipulation of the rheostat of a machine under manual control. It is available in d.c. ratings up to 25 kw. and a.c. ratings up to 44 kva.

### A.C. Starter

A NEW oil-immersed combination a.c. starter for use in corrosive or hazardous gas locations has been developed by General Electric Co. The stainless

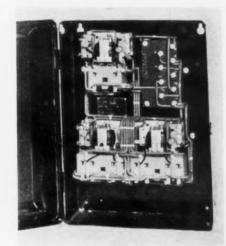


steel and monel metal clad device is available either with or without circuit breaker, and a cast-iron head permits conduit entrance from five directions. Reversible tips prolong contact life, and protection against overloads is provided by an isothermic induction - temperature relay, immersed in oil. Where explosion-proof control is desired, all operating parts can be immersed in oil in a special tank. A new type circuit breaker can be supplied

with the apparatus, which is rated at 10,000 amp. interrupting capacity and designed for operation under oil.

# Multi-Speed Magnetic Starters

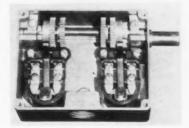
EW magnetic starters of the across-the-line type for use with multi-speed squirrel cage motors have been announced by Westinghouse. These starters are designed to start motors of from 220 to 600 volts and 1 to 100 hp. across-the-line at any speed. Different



speeds are obtained by changing the connections to the motor so as to change its number of poles. Such schemes are commonly employed on machine tools, fans, mixers, conveyors and similar forms of machinery. Starters are available for a great variety of motor types and—apart from a number of optional features—they are supplied with pushbutton speed selection, overload and low voltage protection, De-Ion arc quenchers, and front of board wiring with accessible terminals.

# Limit Switch

SMALL geared type limit switch for application on motor driven devices where it is necessary to limit rotation of the motor shaft or some rotating shaft or gear on the driven machine is offered by General Electric Co. Dimensions of this switch are 411/16 x 3½ x 129/32 in. These contacts are de-



signed for 125-volt, 4-amp. a.c. operation and 125-volt, 1 amp. d.c. operation. Operating mechanism is easily adjusted to operate contacts between a minimum of ½ turns of the driving shaft to a maximum of 120 turns. An overtravel of  $3\frac{1}{2}$  turns is provided to prevent accidental damage to switch mechanism.

# Roller Arm Micro Switch

M ETAL-CLAD micro switch with a roller arm, adjustable vertically through an arc of 225 deg. around its pivot pin and horizontally in eight positions 45 deg. apart, has just been announced by the Micro Switch Corp., Freeport, Ill. This switch is suitable for slide or cam actuation. The steel roller is carried on an oilless bronze bearing and the arm is aluminum diecasting. The unit has a zinc diecast housing and incorporates a small, precision bakelite micro



switch. The single pole, normally closed or normally open switch is rated at 1200 watts up to 600 volts a.c. A life of more than a million operations is claimed. A standard ½-in. conduit hub with wire way for two No. 10, or three No. 14 weather-proof wires is provided.

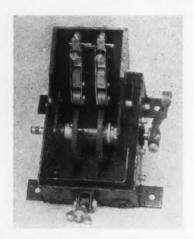
# Space-Saving Wires

I MPROVEMENTS in the covering and reduction in thickness are claimed for the new Dilec Safecote, produced by the National Electric Products Corp., Fulton Building, Pittsburgh, in sizes from 14 to 4/0, inclusive. The new type of covering provides 100 per cent protection of the rubber insulation as compared with about 61 in the usual braided type. Also the new covering eliminates cross-overs of the braided textile. Thus a con-

siderable reduction in size is effected and a No. 12 wire may be used in place of a No. 14. The new covering provides complete sealing against light and air and corroding agents, it is marked and measured every two feet, flame and moisture proofed.

# Limit Switch for Easy Inspection

C AM-OPERATED limit switch with contacts arranged to open for easy inspection and maintenance, and designed especially for control circuits as for hoists, industrial trucks, etc., has been developed by Westinghouse. The new



XC-23 limit switch is available with ratings of 2 amp. at 600 volts d.c. and 25 amp. at 110 volts a.c. The two contacts, normally closed or normally open, are mounted on the Micarta fingerboard which swings upward out of the case for easy connecting, inspection and maintenance. The switch is housed in a sheet steel weatherproof face. A cam shaft on which rollers travel makes or breaks the contact at any point on the travel. The switch can be actuated either by a revolving shaft coupled to its cam, or by the movement of an operating lever attached to the cam.

### Service Controller

RECENTLY Cutler-Hammer, Inc., Milwaukee, brought out a new line of 100 amp. pull-out type service control. The switch is available with or without branch circuits, the 100 amp. pull-out type being rated at 230 volts a.c. It can be had with two 60 amp. pull-outs, and four, six, or eight plug fuse circuits rated 115 to 250 volts. Among the noteworthy features are dead front construction, bakelite

switch base, 3-wire grounded solid neutral, new type solderless lugs on all 60 and 100 amp. terminals, convenient fuse testing facilities, slots in cover and case for sealing purposes, plenty of wiring space.



There are surface or flush mounting types.

### Multi-Breakers

INTRODUCTION of type M multi-breakers for use on three-phase four wire solid neutral 120 to 208 volts a.c. was announced by the Square D Co., Detroit. Three



pole breakers with neutrals are used for this type of service. The breakers will react by opening all poles when an overload or short circuit occurs on any one pole. The breakers are trip-free and cannot be held closed on a short circuit or overload. The indicating handle

shows clearly whether the breaker is On, Off or Tripped. Units are calibrated and sealed at the factory so that the intended and proper capacity cannot be exceeded. Capacities range from 15 to 100 amp. Sheet metal enclosures are furnished with either flush or surface mounting.

# Electronic Controller

COMMONWEALTH ENGINEERING CO. OF OHIO, Dayton, has developed an instrument, the Soren Varitime, to vary the speed of small synchronous electric motors and also to test such motors for speed. Frequency ranges from 18 to 240 cycles can be provided through adjusting the voltage. The unit regulates the speed of motors used in connection with various types of controls and timing systems such as multiple clocks. Instruments already produced are of 30 watt capacity but



other ratings can be made available. It is housed in a sturdy steel cabinet and weighs 20 lb. The speed of synchronous electric motors can be adjusted over a 5 to 1 range.

### Flexible Electric Wire

NEW construction for CordX, A the General Electric Company's type S rubber cord, has been developed. This makes the cord extraordinarily flexible and durable. The cord is designed for use where service conditions are severe and for resistance to abrasion, tear, sun and for increased flexibility. Stripping is made easier by the new construction which employs a bias cotton wrap placed directly over the cord and vulcanized into the inner surface of the rubber jacket. The jacket is made of a mold cured rubber compound containing 60 per cent pure rubber.



Rugged permanently safe!

Rugged permanently safe!

Here's the answer to the flooring problems of modern industry—a non-skid floor that can "take it" 365 days a year.

Hoor that can "take it" 365 days a year.

Without showing signs of wear. "A. W."

Rolled Steel Floor Plate reduces the reduces of costly slips and falls. Provides danger of costly slips and falls. Provides for, on factory and power plant floors, aximum traction for foot and wheel traffic, on factory and power plant floors, stair treads, fire, on factory and power plant floors, catwalks around machinery, stair treads, runways, fire escapes. Fire-proof, crack-proof. Easy to clean, quick to folder.

For complete details, write for folder.

For complete Steel

Roll Steel

DETROIT—A first-class merchandising problem must be handled by the automobile industry soon as a result of design changes and material substitutions that are being put through under the whip of necessity as required by the exigencies of the defense manufacturing program.

Advertising executives are even now weighing the problem in an attempt to establish general policies to govern it. One man acting as liaison between engineering and advertising departments of a major producer sized up the problem the other day in the statement: "I don't know yet whether we will be able to capitalize on a great many of the changes or not. We hope that it won't be necessary to apologize for any of the

things that will be forced upon us." He added that there is serious questioning about the possible "policy" on "flag waving" in connection with the changes and substitutions that will be made.

This merchandising problem is being weighed along with engineering and economic and production questions that have arisen. Probably it is last to be answered, but it is by no means last in importance or difficulty. Customer acceptance of the changes must be satisfactory; if not, sales, production, materials consumption and labor will suffer as a consequence. Of course, if taxes restrict consumer ability to buy and cut down on sales anyhow, or if shortages of materials or labor become pressing, then all calculations and guesses go out the window.

# Problem Handled in Different Ways

There are two schools of thought on the merchandising aspects of substitute materials. Each is illustrated by manufacturers' handling of the refrigerator ice cube tray problem. In an instance reported here a few weeks ago, the use of a steel tray coated with lead alloy and plastic to give the appearance of an aluminum tray was cited. This is one approach to the problem-an attempt to make the substitute product look so much like the original that no questions will crop up in the customer's mind. Then there is no explaining to do, no new selling job to be done. The other approach which is being used by some manufacturers is the sharp break with tradition that gives the manufacturer's sales force an entirely new story to tell about a new product, new materials, new manufacturing methods. Refrigerator manufacturers in some instances are doing this by adopting clear plastics or colored plastics for trays and other parts. An industrial designer who is credited with several

On The Line

Assembly

By W.F. SHERMAN

Detroit Editor

• Automobile industry trying to decide on correct policy in acquainting public with forced substitutions... Extent to which plastics will be used is still unsettled... 1942 model changes to be simplified... Car output off 5%.

achievements in the refrigerator and automotive industries, maintains that in many instances like this, plastics have a definite appeal to women buyers, and that the break with tradition is amply justified.

The extent to which plastics will be adopted is still unsettled. Many things are being tried now which probably will not appear in production. However, in no event will cars turn predominantly to plastics. In one instance today the designers working on a 1942 model have succeeded in switching 14 pieces from metal to plastic, representing about a 20 per cent increase in the number of plastic parts used in that particular car, according to one authority. This would indicate that originally 70 different parts of the car

were made of plastic, or so-called plastic materials, and that the number will be increased to 84. Obviously, this must take into consideration every minute plastic part. It still isn't very many parts when the thousands of parts in the modern automobile are taken into consideration.

# How Many Parts in An Automobile?

Incidentally, "how many parts in an automobile?" is always a good question, even in Detroit. Last Thursday a Pontiac publicity release started out "there are more than 3000 separate parts in the modern automobile"—which is on the conservative side in contrast with Ford publicity released on the same day with a reference to "an intensive study of many of the 15,000 parts in the Ford V-8." The technical data division in another manufacturing concern has counted 8394 parts in a 1940 model without breaking down purchased units such as ball and roller bearings, locks, instruments, parking lamps, fuel pumps, etc., into individual pieces.

The job of finding substitutes for strategic or critical materials brings out the tragic need for more information, especially on materials which are proposed as substitutes. Requests for data reveal, for instance, that manufacturers of plastics—in spite of their glamorous and colorful ballyhoo—have not succeeded in educating some parts of industry in the proper mechanical uses of their product. This lack of knowledge is no reflection on the materials, but the concentration of attention on the "sex appeal" of plastics is corollary to the lack of stress on subjects of more importance in the present instance. Plastics manufacturers are trying to plug the gap now and also cope with the intense interest that has been aroused by shortages and anticipations of shortages in essential

# We know the importance of GAGES from experience

Nearly fifty years ago Greenfield Tap & Die Corporation began to manufacture gages-because the open market didn't afford the accuracy and reliability we required. Today all our manufacturing operations are checked with the proper gages.

The recognized accuracy and reliability of "G.T.D. Greenfield" Gages has resulted in the present country wide demand for them. Our Gage Division already one of the largest in the country, will be more than doubled when present construction is completed. We shall continue to build the best gages that can be made, and to further expand our gage engineering service.

### GREENFIELD TAP & DIE CORPORATION Greenfield, Massachusetts

Detroit Plant: 2102 West Fort Street. Warehouses in New York, Chicago, Los Angeles and San Fran-cisco. In Canada: Greenfield Tap & Die Corp. of Canada, Ltd., Galt, Ont.

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TAPS . DIES . GAGES . TWIST DRILLS . REAMERS . SCREW PLATES . PIPE TOOLS

THE IRON AGE, March 27, 1941-69

metals. Monsanto Chemical Co. has announced establishment of a staff to help manufacturers solve problems of making satisfactory substitutions now.

In meeting the substitution problem, Ford engineers and research men have already mapped out changes in the making of automobile parts that will mean an 80 per cent reduction in requirements for nickel, 50 per cent in aluminum and 50 per cent in zinc, it has been announced. In some cases Ford has already made noteworthy changes in materials, dating back to 1935 when the company started using steel pistons of the same weight as the aluminum pistons previously used.

As fast as parts are changed at Ford they are arranged in a display with the replacements alongside the original parts. An estimate of savings provided by the changes made so far, places the reduction in consumption of zinc at about 6000 tons yearly.

A partial list of changes planned by Ford, or already accomplished, follows:

In place of nickel—straight chromium steel instead of nickel chromium steel on all bright metal trim; use of chromium-molybdenum instead of nickel steel for transmission and differential gears; use of heavier copper plate and higher polish on copper base for nickel plating to reduce thickness of nickel necessary for protection and avoid necessity for buffing nickel plate.

For aluminum (in addition to steel piston replacement) - eight out of 10 tractor parts now made of aluminum will be changed to iron or other ferrous material; aluminum timing gear replaced by steel and bakelite gear; aluminum cylinder heads replaced by cast iron head found to be more efficient and corrosion resistant; diecast or powdered iron moldings substituted for aluminum in brake wheel pistons; aluminum valve chamber cover replaced by cast iron, aluminum distributor body replaced by cast iron.

For zinc—largest use of zinc on Ford car is in metal die-cast trimmings, which are being replaced in part as rapidly as possible for exterior use by steel stampings; steering post hub and brackets from zinc die-castings to steel stampings or malleable castings; instrument panel grille requiring 2¾ lbs. of zinc to plastic panel; die-cast zinc horn button to plastic; interior metal trim replaced by plastic or bright finished steel; radiator shells from brass (requiring 35 to 40 per cent zinc) to copper; glass reflector for rear of sealed beam headlamp to replace silver-plated brass.

Magnesium is no longer used on the Ford tractor, according to the company. However, the pioneering use of small magnesium castings on the tractor is now counted on to provide a good source of secondary magnesium.

## To Simplify 1942 Model Changes

Model changes for 1942 will bring some simplification in the number of different lines of cars offered by Pontiac, it is learned. Present plans call for discontinuance of the big custom job, to reduce the line to two groups-the streamline torpedo and the de luxe torpedo, which is the lowest priced in the line. The de luxe is scheduled for a thorough change in appearance. Its lines at present do not include the so-called "fast" back which feature the streamliner type of torpedo. The streamliner, which is extremely popular, will be continued with refinements.

The more thoughtful executives and engineers in the auto and aircraft industries have found their ideas expressed very well in the concluding remarks of the address in which C. C. Carlton, managing director of the Automotive Committee for Air Defense, told the Society of Automotive Engineers in Washington on March 14 that his organization would gradually fade out of the picture and out of the automotive program for building bombers.

He said in his "swan song": "I would like to live to see whether or not some of the precision tolerances now required by the aircraft industry are reflected in the automobile of 1945 and to see the results of the mass production methods of the automotive industry reflected in the aircraft of 1943."

Because automobile dealers face the prospect of relying largely on repair shop profits if and when automobile production is affected unfavorably by the defense program, they are beginning a nationwide program to train mechanics. The training of new men is required, according to the National Automobile Dealers' Association, because the draft and the rapid turnover in labor is creating a shortage of automobile mechanics.

Pontiac and Plymouth have recently announced establishment of special training programs for mechanics and salesmen to meet similar problems. D. U. Bathrich, Pontiac general sales manager, summed up the reason for establishment of such training as follows:

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"Looking ahead for the next year or two you will witness a growing withdrawal of your younger employees into the armed services. Because this comes at a time when sales and service staffs are strained to the utmost by consumer demands we have decided to set up schools to train replacements for you."

# Chrysler's Pension Plan

Chrysler Corp. stockholders will consider at the annual meeting, April 15, a plan for voluntary contributory retirement income for the benefit of eligible salaried employees receiving more than \$250, supplemental to the old age benefit provisions of the federal Social Security Act. To carry out the plan, annuity contracts would be purchased.

The plan appears to be comparable to that adopted recently by some other companies. A working example is that of Monsanto Chemical Co., which has one plan for employees earning in excess of \$3,000 a year and another plan for those under \$3,000. In Monsanto's annual statement the section referring to the \$3,000 and above, points out that the Social Security Act does not provide any pension in this bracket and is unlikely ever to do so. The phase of the plan affecting employees below \$3,000 level is designed to make up the difference between the Social Security payment and what was deemed by the company to be an adequate retirement pay. This part of the plan is administered by the company and its cost is not participated in by employees.

Automobile production eased off about 5 per cent during the past week from the high point of 131,410 cars and trucks which, in the previous week established a new peak.

# Vanted: Tough broaching jobs

 Every year Oilgear broaching machines are adding more and more speed to production lines . . . and cutting production costs. Every year Oilgear broaching machines are solving new tough production problems. They are the product of unmatched hydraulic experience and continuing research, and they possess an enviable reputation where broaching methods are vital. They have played an important part in the development of modern broaching advances and in eliminating many seemingly permanent "bottle-necks" in modern production lines.

And now, the re-designed Oilgear Broaching Machines are licking tougher production problems than ever . . . are knocking costs per operation down to an unprecedented low.

Every Oilgear Broaching Machine has been definitely improved so that it is unusually convenient to operate; it reduces the operator's work and effort; it gives faster broaching and return speeds which are independently variable; it provides new tool and work capacities and new high standards of precision broaching.

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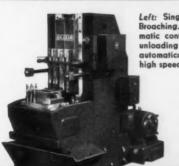
Regardless of the broaching operation, you can do it faster, more profitably and economically with Oilgear. We suggest you send at once for the new Oilgear Bulletins describing these improved machines in detail.

Use the handy coupon below. Send for any or all of these bulletins at once. Don't delay. They mean sizeable profits for you. THE OILGEAR COMPANY, 1324 W. Bruce Street, Milwaukee, Wisconsin.

Left: Gooseneck Broaching Presses are made in 5 sizes. Open design permits straight line production. Simple time and motion saving control.

Right: Two Column High Speed Broaching Press minimizes cycle time. Cush-ioned ram motion increases tool life. Provides sensitive control of variable

> Cyclematic, Simplified automatic internal broaching. Improved design. Handles multiple broaching. 3 sizes. Convenient loading level regardless of size or stroke.



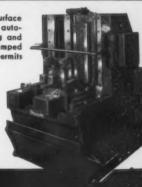
Vertical Pull-Down. For In-

ternal Broaching, Eliminates tool handling, threading and centralizing by hand.

Simple push-button opera-

Single Slide Vertical, 11 Sizes Broaching. Manual, semi-automatic and full auto-matic control. Shuttle table makes loading and unloading easier. Work clamped and unclamped automatically. Harmonic table motion permits high speed without shock.

> Right: Double Slide Vertical. 11 Sizes. Surface Broaching. Sequent operations on one or ently varied to suit job. Control and shuttle table feature same as Single Slide Broach



fluid power

High speed, Internal and External Broaching, accurate, extra-convenient control and operation.

FLUID POWER

feeds . Pumps . Cylinders



Horizontal and Vertical Broaching Machines . Horizontal and Vertical Presses . Custom Built Machines

THE OILGEAR COMPANY, 1324 W. Bruce St., Milwaukee, Wis Please send descriptive bulletin of the following new Oilgea Broaching Machines. (Check which.)

- □ XL & XB Horizontal Types
- □ XD & XS Vertical Surface
- ☐ PG Broaching Presses ☐ XP Vertical Pulldown ☐ XM Vertical Cyclematic ·

Name..... Title.....

Company .....

7 ASHINGTON — Perhaps it is in bad taste to talk of the silly, foolish dol-Nevertheless lar sign. now and then a bold citizen who rates only a speck of the otherwise indifferent taxpaying public shows casual concern over the enormous cost of government. Quaint though the spenders think it is, the notion prevails that the government expenditures for non-defense needs could and should be scaled down sharply. One great difficulty this old-fashioned citizen would encounter obviously would be to find a government agency that under one pretext or another has not horned into the defense picture or is trying to do so. Already by ingenious and highly imaginative means there are no less than 80 agencies that have man-

aged to be listed in the defense category, meaning they have successfully played the game not only to keep going, but that many have hit the jackpot for more money and increased personnel.

The expected Federal debt at the end of the current fiscal year is \$49,000,000,000, and in view of the authorized \$16,000,000,000 additional debt limit, raised to \$65,000,000,000, expenditures for the fiscal year 1942 are estimated at the astronomical figure of \$25,000,000,000, or \$70,000,000 daily, compared with estimated

receipts of \$9,000,000,000 for the year.

In 1916, just before the United States entered the World War, appropriations to run the federal government were slightly less than \$1,200,000,000, and that also was approximately the amount of the government debt.

### Civilian Payroll 2 Billion Yearly

That sum would not pay interest on obligations for the current fiscal year. It would barely pay more than half of the present civilian payroll, now running at the rate of more than \$2,000,000,000 a year. This is almost twice the present all-time rate of the payroll for the entire steel industry with about 600,000 employees. The executive branch of the government has some 1,200,000 employees, the highest on record. So-called "defense workers" are pouring into Washington in vast hordes.

When the New Deal took office in 1933 there were less than 600,000 Federal employees on the civil payroll. During that year the number rose to about 850,000 with a monthly payroll of approximately \$125,000,000 or at the rate of \$1,500,000,000 a year. Federal office space throughout the United States a few months ago was 118,225,000 sq. ft., or more than four square miles in 19,197 buildings, and the un-

BY L:W.MOFFETT
Washington Editor

• Payrollers in Boomtown
(Washington) crowd out lonely
citizen who wonders: "Why
can't non-defense spending be

cut?" . . . U. S. expenditures for

next fiscal year to be \$25 bil-

lions, tax receipts \$9 billions.

ending demand for stili more space has increased these gargantuan figures. Government civil payrollers in Washington, numbering 150,000, were housed in 317 buildings with a total of 26,000,000 sq. ft. Of this number of buildings the government owned 140 with 21,177,000 sq. ft. The remaining 177 buildings with 4,823,000 sq. ft. were rented at an annual cost of \$4,870,000. Outside of Washington the federal office space was 92,225,000 sq. ft. in 18,800 buildings, of which 57,225,000 sq. ft. was government-owned property in 3230 buildings. The remaining non-Washington government space of 35,000,000 sq. ft. in 15,650 (of which 8000 were postoffices) is rented at an annual cost of \$19,-500,000.

The city of Washing-

ton has broken out at the seams and new space and more employees in nearby Maryland and Virginia are to be provided. The taxpayer, unless he is on the government payroll, is convinced that he is made to ante for enormous unnecessary government costs, both by way of the number of alphabetical soup agencies and number of employees. Just in the incipiency of enormous taxes, he is already certain that a sharp reduction in both would mean better government, feeling that there are thousands of idlers on the payroll and that numerous agencies are engaged in activities whose abandonment would be a service to the country and would permit more of the tax load to go toward national defense. As the set-up is, it is a paradise of patronage for the politicians, but quite the opposite for the poor taxpayer, even overlooking the disturbing political significance seen in such growth of government, and its tendency to dominate and regiment the life of the country.

### Like Main Street on Circus Day

The mass movement of payrollers from all parts of the country has given Washington the complexion of Main street on circus day, or of a jammed boom town where riches have been discovered. From point in growth, too, Washington has zoomed 36.2 per cent the past decade to a population of 663,000. Forecasts are made that the "defense" program will boost the town's population by 200,000.

Everybody, so it seems, is on the Federal payroll or trying to get on it. Payrollers so crowd government offices that they are in each other's way and seem to be in need of traffic regulations. This is not true of some bureaucrats who hold forth in luxurious quarters that are as spacious as a tennis court. The old idea that the public should support the government rather

# Help keep your drills POINTED FOR PRODUCTION...



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OPERATION - Drilling a 3%" hole in the solid.

MACHINE -"AMERICAN" 5' 15" Column Hole Wizard Radial Drill.

MATERIAL -S. A.E. 1020 Cast

SPINDLE SPEED -83 R.P.M. FEED -. 018 inch.

CUTTING LUBRICANT -1 part Sunoco to 20 parts water.

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CUTTINGOIL

# SMOOTH ROUND HOLES WITH SPEED AND ACCURACY

PRODUCTION and still greater production . . . that's the order of the day. And, to meet this demand, drills must cut fast . . . cut clean . . . and hold their edges—they must keep pointed for production!

That's why leaders of the machine tool industry choose, use and recommend SUNOCO Emulsifying Cutting Oil for their machines. They know its high heat absorbing and lubricating qualities aid drills in cutting true cylindrical holes -with speed and accuracy. They know that-with SUNOCO-drills clear easily, do not clog, bind, chatter or burn . . . and "down time" for regrinds can be reduced.

Keep a step ahead of production demands with the correct cutting lubricant -use SUNOCO. Test it in your own plant-let the results prove its merits.

SUN OIL COMPANY . PHILADELPHIA, PA.

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PETROLEUM PRODUCTS FOR ALL INDUSTRIES



than that government should support the public appears to have been reversed.

And so, too, is the idea of the man whose 209th birthday anniversary was recently commemorated.

Said George Washington to his Secretary of War:

"My observation on every employment of life is that wherever and whenever one person is found adequate to the discharge of a duty by close application thereto, it is worse executed by two persons, and scarcely done at all if three or more are employed thereon."

# British Opens 7th Washington Office

Washington

• • • • The British Purchasing Commission has leased an apartment building at 1800 K Street in Washington to house the expanding facilities of a special ship mission and food mission. This brings to seven the number of different offices maintained in Washington. Headquarters of the British Supply Council are still located in the Willard Hotel.

# Metal-Conserving Unit Organized By OPM

Washington

• • • A new unit has been established under the Office of Production Management to study and recommend ways for conserving, reclaiming, and finding substitutes for strategic metals and other essential defense materials. Keeping reclaimed strategic metals flowing smoothly into consumption by defense industries was listed as one of the problems with which the new unit will deal.

Identified as the Unit of Conservation of the Materials Branch, OPM Production Division, the new division will be headed by Robert E. McConnell, former president of Mayflower Associates and mining engineer. An OPM statement announcing the establishment of the new division emphasized that an effort will be made to hold to a minimum the economic dislocations which may result from the adoption of substitutes.

Indicative of the work which the the OPM said that private compa-

nies are doing voluntarily to utilize substitutes, the announcement cited studies under way to reduce the consumption of manganese in the steel industry, adoption of the policy of using steel dials on telephones in lieu of the conventional aluminum dials, and further efforts by the telephone industry to conserve aluminum, nickel, zinc and, to some extent, magnesium.

Finding suitable substitutes for tungsten, aluminum and other vital defense materials will be part of the program under which Mr. McConnell is expected to encourage and direct private industry and others to carry on research. The development of plastic substitutes, already being explored by manufacturers of automobiles, refrigerators, washing machines and vacuum machines, is likely to play an important role in the program to conserve defense materials.

### Employers, Employees Push Defense Training Program

Washington

• • • The conference on expanding the defense training program, attended by representatives of the metal trade industries, has decided among other things that the program should be conducted primarily within the various plant units involved in the defense program.

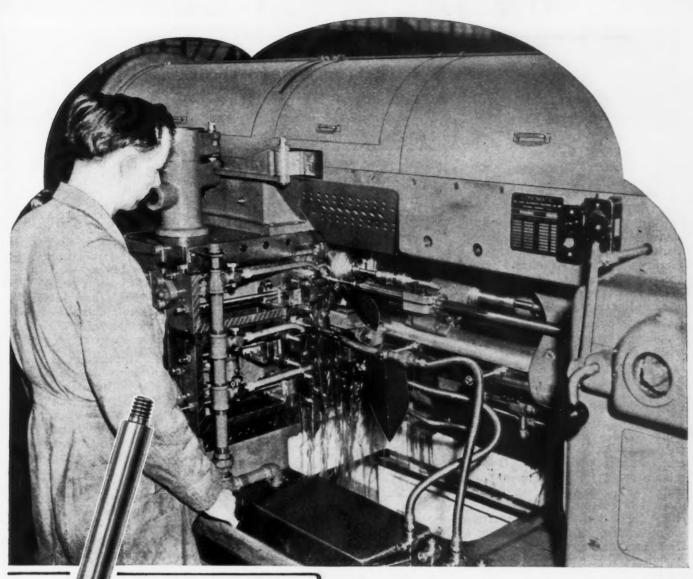
A joint management-labor committee designated at the meeting consisted of Maj. Albert Sobey, director, General Motors Institute, Flint, Mich.; Randall Irwin, industrial relations director, Lockheed Aircraft, Burbank, Cal.; and Marion Hedges, research director, AFL union of electrical workers. Clinton Golden, SWOC regional director, was named chairman of the committee.

Since the meeting last week. Sidney Hillman, OPM associate director general, has announced that defense training courses will be given priority in vocational schools under a system which provides that local representatives of the United States Employment Service will recommend to schools the types of defense occupations for which workers will be trained and the number of persons to receive the training.

THE BULL OF THE WOODS

BY J. R. WILLIAMS





COMBINED CUTS AND CONOMATICS

# AN IDEAL COMBINATION

A 114" Six-Spindle Conomatic produces the 414" brass valve stem (at left) in 9 seconds. The 11 operations performed on this part include 4 forming cuts, 4 cuts with roller turners, 2 threading operations, and cutting off — all to close tolerances. By combining machining operations on a Conomatic, you can expect a reduction in the cost of your product — improving it without added cost — and an increase in profits. Send prints of your machine parts to Cone for a complete cost analysis. There is no obligation.

CONE AUTOMATIC MACHINE CO., INC. WINDSOR, VERMONT, U. S. A.

# ON THE WEST COAST



A SURVEY taken in the San Francisco Bay Area ship-yards last week showed that an additional 18,637 skilled workmen will be required when peak employment is reached on present contracts late next year. Southern California, where aircraft manufacturing activity skimmed the cream off the skilled labor supply, is feeling a pinch already. Scarcity of skilled men at Seattle is marked.

One conclusion to be drawn by coupling reports of labor shortage with surveys showing large unused shop capacity is that there must be a reservoir of skilled mechanics working in the smaller shops. Unused machine shop capacity on the Coast is divided into many small units, some of them one and twoman operations. These small operators understandably want some return from the capital invested in their machinery as well as from their skill in using it. In this territory particularly, the OPM faces the problem of making use of these already skilled workmen and their machines as well as training new workers

In Southern California, another source of skilled labor which will undoubtedly be tapped is the oil supply industry. With the oil country quiet, many of its workers can readily be used in nearby shipbuilding yards and airplane factories without population dislocation.

A NEW facet of the shipbuilding program showed itself on the Coast last week with the award of contracts for wooden mine sweepers. This type of construction will be a bounty for the Pacific Northwest, particularly Tacoma, Wash., where ten of the wooden vessels will be built.

Noticeable in last week's ship-building awards were the names of 15 Coast yards which previously had not held defense contracts. Included on the list were builders of pleasure yachts and fishing boats. Location of the new entrants in the Navy ship race is well scattered. In addition to the Tacoma yard, one is located at Winslow, Wash.; one at Astoria, Ore.; one at North Bend, Ore.; two at San Francisco; one at Antioch, Cal.; one at San Diego, Cal.; two at Stockton, Cal.;

• San Francisco Bay shipyards to need 18,637 more skilled workmen when peak employment is reached next year... Japanese vessels hasten to load lead before export licensing deadline.

two at Los Angeles Harbor; and one at Newport Beach, Cal.

San Francisco's waterfront last week was reminiscent of a saloon at closing time, with three Japanese freighters hastening to load pig lead before that metal was subject to export licensing March 24. A similar last minute rush of Japanese vessels occurred last October just before the embargo on scrap iron took effect. During the last two weeks of the scrap iron rush, custom permits were issued for a larger tonnage than was exported in the entire previous year, but insufficient bottoms were available to carry it to the Land of the Rising Sun.

THE ships loading lead at San Francisco last week and their cargos, were the Kunikawa Maru, 60,000 bars; the Durban Maru, 400 tons; and the Tatuta Maru, 500 tons. The Japanese are frank to admit that Uncle Sam's antipathy toward lowering the boom swiftly and suddenly upon lead exports will make it possible for them to manufacture over 100,000,000 machine gun bullets or their equivalent.

Necks of Burbank, Cal. residents crane daily at test flights of Lockheed's pursuit interceptor plane, and observers state that its top speed is well in excess of the 400 m.p.h. claimed which would make it the fastest plane made. Designed, as its name suggests, to drive away pursuit ships, the plane's chief virtue is that it can perform equally as well at 25,000 ft. as at 5000 ft. due to a turbo-supercharger. It is powered by two

1150 hp. Allison liquid cooled motors, climbs quickly, and retains its speed at high altitude.

Faced with the problem of increasing its personnel from 82,191 on March 1 of this year to a projected 155,950 in June or July, the Southern California aircraft industry is working on the assumption that few trained men will be recruited from other industries, and that aircraft must do its own training. This is being done principally in three ways:

1. Pre-employment training. Many public and private schools are offering short courses in sheet metal work and other lines intended to train men for aircraft employment. In most cases this training is at the prospective employee's own initiative, but in some plants the aircraft company is paying the cost. In the case of manual workers, this sometimes consists of apprentice training with a few hours on the job and a few hours in school each day. Engineering and design personnel are being sent at the plants' expense to such schools as the California Institute of Technology, which has set up a special aircraft training department, and the University of California. Onethird of the 20,000 employees at Lockheed and its subsidiary Vega are engaged in trade extension classes. These are all voluntary, and if employees show special aptitude in a 20-week course, they are promoted to advanced work in the plant. Northrup utilizes a trade extension course in various schools: Vultee relies also on trade extension education: Consolidated is specially training engineers at the University of California.

2. On-job training. In particularly wide use is the learner system in which the work is broken down into the smallest possible component unit and each man understudies a single operation. This limits the amount of training necessary to make a man an effective part of production, but calls for elaborate planning in the personnel departments. On-job training is used in conjunction with instruction courses in most cases. North American in 1940 trained about 4000 new men in its plant in this way, and

now is engaged in training supervisors for the new Dallas plant.

3. Advanced training. Nearly all of the large plants provide teachers and equipment for day and night courses open to voluntary enrollment by the employees. In this way, employees are prepared to step up the ladder when additions are made to plant capacity. Douglas has a comprehensive educational program which includes technical training lecture series, draftsmen's training, shop training courses, plant tours for employees, and home study courses.

BOEING, at Seattle, contributes both instructors and equipment to the Edison Vocational School, a state institution. Other phases of the Boeing educational program are free employment training, extension work, and advanced classes.

Boeing's No. 2 plant which will add a million sq. ft. of floor space, is nearing completion, making the companies total floor space about  $2\frac{1}{2}$  million sq. ft. Eventually all production work will be moved to Plant 2, and Plant 1 will be utilized for experimental work.

Last week Boeing launched the first of six new Atlantic Clippers for Pan American. This will make possible six transatlantic trips each week for the Airways, instead of three as at present. All six will be delivered to Pan American by midsummer, six months in advance of their contract of delivery date. The new ships are more powerful than the present clippers and carry a fuel supply allowing an effective run of 4000 miles, enabling them to make the Atlantic trip without stopping at Bermuda and the Azores.

DOUGLAS AIRCRAFT CO. has announced that it is now turning out military aircraft parts at a rate approaching capacity output of more than 44,000 pieces every 24 hours. Much credit for this rate is accorded the Guerin process which utilizes hard rubber mats instead of metal dies in hydraulic presses. The female die is dispensed with, and the compressed rubber serves in its place, making it possible to turn out a greater number of small parts in one operation.

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The process for using hard rubber first was perfected at the Douglas Aircraft plant at Santa Monica, and later was made available by licensing to the entire industry. It was designed by Henry

SEATTLE AND TACOMA SHIPBUILDING CO. (PLANT NO. 2) (A) LAKE UNION DRY DOCK AND MACHINE WORKS (B) TODD SEATTLE DRY DOCK CO. (B) LAKE WASHINGTON SHIPYARDS (HOUGHTON) YARD. erton - PUDGET SOUND BRIDGE AND DREDGING CO. \* Seattle SEATTLE AND TACOMA SHIPBUILDING CO. (PLANT NO. 1) (A) Tacoma Portland OREGON SHIPBUILDING CO. (A) WILLIAMETTE IRON AND STEEL CO. (A) COMMERCIAL IRON WORKS ALBINA ENGINE AND MACHINE WORKS CALIF PACIFIC COAST SHIPYARDS: Shown here the location of principal shipbuilding and ship repairing NAVY YARD (MARE ISLAND) yards on the West Coast, according to the National TODD CALIFORNIA SHIPBUILDING CO. (A) MOORE DRY DOCKS CO. Council of American Shipbuilders. GENERAL ENGINEERING AND DRY DOCK CO. Oakland San Francisco \* Stockton Alameda DRAVO CORP. (A) BETHLEHEM STEEL CO. (B) BETHLEHEM STEEL CO. (B) (HUNTERS POINT) WESTERN PIPE AND STEEL CO. BETHLEHEM STEEL CO. LOS ANGELES SHIPBUILDING AND DRY DOCK CO. - CALIFORNIA SHIPBUILDING CO. (A) Los Angeles \*
San Pedro \*
Long Beach BETHLEHEM STEEL CO. CRAIG SHIPBUILDING CO CONSOLIDATED STEEL CORP. (A) (A) - Shipbuilding only (B) - Ship repairing only

Guerin, a Douglas production executive.

UAW workers at three Oakland, Cal., General Motors plants were on strike last week in a dispute over the firing of workers and an alleged speed up. Some neutral sources believe the strike was merely a "softening up" of the company for wage increases. Twenty-two hundred men were out in the Chevrolet passenger car assembly plant, the Fisher Body plant, and the Chevrolet Truck di-

vision. As a result of the strike, workers were also idle at the L. A. Young Spring & Wire Corp. and Automotive Fibres, Inc., General Motors suppliers.

In an NLRB election at North American Aviation, Inc., Inglewood, Cal., a majority of 70 votes made CIO the collective bargaining agent. Out of 6095 votes cast from about 8000 eligible employees, CIO received 3043 and A.F.L. 2973.

The Harville Aircraft Die Casting Co. strike has been settled.

# Tatique Cracks

### Stratospheric Steed

Among those who have glided recently into the one big, more or less happy family of readers of your f.f.j. (now at its all-time high) are the Ariel Aircraft, Inc., Coffeyville, Kans., and the Mercury Aircraft Co., Menominee, Mich. Ariel and Mercury, you will recall, are among the mythical characters who flew through the air with the greatest of ease. Another who never had occasion to run his heels down was Bellerophon, being blessed with a horse that had wings as standard equipment. Naming a plane Bellerophon would be like equipping it with a built-in headwind, but the nag's name, Pegasus, is both pleasant and alliterative, and we deed it to the first taker.

## Donkey Division

• • • With eyebrows elevated we noted last week that after all the talk about a motorized army, the Government Awards section (see page ...) reported an order to the Blackhawk Mfg. Co., Milwaukee, for \$264,225 worth of jack assys.

Puzzled also is W. E. (International Harvester Co.) Brewster, who writes, "If the Jeffersonians are ordering new emblems a serious mistake has been made in spelling."

# How Joe Has Aged!

• • • But we aren't the only publication that makes mistakes. Sam DeWolf, our Pennsylvania - and points - south circulation ambassador, spotted this in the Philadelphia Evening Bulletin.



Kennedy at Lease-Lend Hearing Retiring Ambassador to Britain testifies before House Foreign Affairs Committee (Associated Press Wirephoto)

# Coast States Admitted to Union

• • • Did you notice that a new section, "On the West Coast," began last week? See page .... The Pacific Coast states produce more airplanes than the other 45 states combined, and industrially the area on the west slope of the Rockies is growing like kitten on a cream diet.

We think you are going to like the new section, for Charley Post, who edits it, not only has a news nose but also an uncommon ability to arrange words in attractive and colorful patterns. Glimpse these plums in his first pudding:

Some newly organized big concerns have grabbed juice tidbits, but most of the small and medium sized concerns still have no contract chicken stewing in their pots.

. . . he (the little man) is like to be behind the door when the jelly is passed out.

Some firms reputedly have not farmed out work because of an entirely understandable disinclination to play mother hen to future potential competitors.

... the Chamber of Commerce would organize the small factories into a series of hanseatic groups to handle subcontracts.

### He Clicked at Pistol's Point

• • • These are trying days for your favorite family journal's traveling editors. As proof we cite the experience of associate editor X who had to get a photograph of a

certain machine used in an arsenal. He got permission to get the picture all right, but along with him went a guard with a gun to see that he got just that picture and no more.

X is not used to having a gun pulled on him and the experience made him somewhat jittery. So much so that when he saw, on his next plant call, a large gap lathe, with "Monarch" on the headstock and "Fitchburg" on the tailstock, he jumped to conclusions, resulting in the item which you probably didn't read in "Fatigue Cracks" of Feb. 27.

But E. L. Fickett, chief engineer of the Fitchburg Engineering Corp., Fitchburg, Mass., read it and didn't like it, as we said his company makes steam engines. It doesn't now. It makes high production milling and boring machines. And furthermore—the next voice you will hear will be that of Mr. Fickett:

"... the headstock on this lathe, as well as the tailstock and carriages, was designed, developed and built by the Fitchburg Engineering Corp. The Monarch headstock was mounted on the side of the headstock proper, had a pinion in its spindle nose which drove a ring gear at tached to the face plate. These carriages have the unusual feed range of from 1/64 in. to 36 in, per min."

Mr. Fickett, we are sorry and ashamed. As the French used to say, to excuse anything from a fragrant egg to a train that should have arrived yesterday and will probably get here tomorrow, c'est la guerre.

# He Wants to Start Something

• • • We are asked by G. W. Barnes of Samuel Osborn (South Africa) Ltd., Johannesburg, to "wage a bitter battle against such monstrosities as spelling alignment 'alignment' and scentic as 'skentic'."

'alinement' and sceptic as 'skeptic'."

"Skeptic," of course, was introduced to lessen the number of references to sceptic tanks, sceptic poisoning, and so on. But there is no excause for "alinement." For as long as we can remember it has been spelled that way on The Iron Age style sheet. It was probably adopted during the reign of Roosevelt I, who hipped on phonetic spelling, and who antagonized those who wrote on space rates by advocating such simplifications as enuf, tho, sed, and so on.

Alinement probably seemed good at the time, but it did not take, and now, because it is strange to the eye, it halts with the steady flow of ideas from the printed page to the cerebrum. We know a fellow who knows the cousin of one of the members of the brains department, and when the next style sheet revision convention is held we will try to have it slipped into the agenda.

## Use Xenophobia Vanishing Cream

• • • It has always seemed to us that the highbrows in the advertising department are missing a bet in not giving the handy little word *xenophobia* more of a play. As you know, it means fear of strangers. From what we hear, all of us are xenophobes to greater or lesser degree. Some primitive tribes even reflect it in their language. For example, the Bakairi, a Brazilian tribe, use the word *kura*, for "we," meaning good, noble, while "they" (strangers) are *kurapa*, means bad, evil, ugly.

Obviously, people like to deal with firms they are familiar with. The unknown is instinctively distrusted. Now, in order that you will know them, the firms that want you to deal with them have taken 1355 pages of advertising in your f.f.j. during the first quarter of this year. That's tops for the whole field, be believe, which certainly makes your f.f.j. the No. 1 xenophobia dispeller, and something should be said about it. We would like to see our favorite artist, Harry Johnson, take a crack at illustrating xenophobia in four colors.

### Problems

The answer to last week's cry for bigger, better bald spots is 9.6 years as "my" age, 38.4 for my mother's, 16.8 for my sister's, and 50.4 for my father's. All are present ages.

The correct answer to this in 25 seconds, done "in your head," puts you in the No. 1 chair:

In the bottom of a 20-ft. well there was a frog who began climbing toward the top at the rate of 3 ft. every day. Each night, however, he fell back 2 ft. In how many days did he get out?

# Plews of Industry

WORKING AROUND THE CLOCK: U. S. Steel Corp.'s South Works at Gary, Ind.

# Allis-Chalmers Strike Hits Largest Defense Plants in the Nation

By HERMAN L. KLEIN (Chicago Editor, The Iron Age)

• • • The 65-day strike at the Allis-Chalmers Co. plant at West Allis, Wis., has crippled an important part of the national defense program.

Estimates of the volume of defense orders directly and indirectly affected by the shutdown—which began Jan. 22—range as high as \$500 millions.

Twenty-five destroyers—vitally needed for defense and for aid to Britain in maintaining its sea lanes—are included in a long list of items shown in a survey by The Iron Age to be held up by the strike.

More than \$45 million in direct defense contracts which fan out to affect operations of most of the large manufacturers producing war materials and equipment in the U. S. all-out defense program, are directly held up by the strike. About \$35 million in direct Navy contracts are blocked (leading to rumors that the Government itself might eventually seek to open and operate the plant), and \$10,000,000 in direct defense work by

leading companies from coast to coast is involved.

There is no clearly defined reason for the stoppage of work at Allis-Chalmers, and the stoppage is fast becoming the "Mystery Strike" of the national defense program. One demand of the CIO affiliate is the closed shop. This, the company maintains, would be disastrous for workers and would give the union control of production. The entire issue is befogged and befuddled in a welter of confused handling which, it has been charged, starts in Washington.

Because of defense restrictions, specific Navy jobs on Allis' drafting boards and in the Allis plant cannot be described. However, defense work other than Navy jobs can be listed in a general way, as representative of the entire defense picture affected by this strike.

Every newspaper reader knows that the Ford Motor Co. is building a new factory for the daily production of 15 Pratt & Whitney engines, delivering 1850 to 2000 hp. This almost windowless, completely air-conditioned plant was scheduled for completion on March 29. Four compressors and

four turbines are on order at Allis-Chalmers. Until these are obtained, according to one Ford engineering official, "Production will be seriously impaired." It is pointed out that air-conditioning is needed for ventilation and comfort of employees and for precision control of engine parts. Of course, the plant cannot operate at all without installation of the turbines.

Other aircraft production held up is that at Bendix, which awaits its large order for vacuum pumps needed for testing of carburetors. Compressor units will not be shipped on time to Langley Field, the Government testing field in Virginia; nor will Wright Field at Dayton, Ohio, get its switch gear units when needed; and Ingersoll-Rand, big producers of precision gears, awaits important electrical equipment. Thus Uncle Sam's aircraft program receives another major setback.

One of major defense worries is the aluminum bottleneck. Biggest producer, the Aluminum Corp. of

VITAL BUT IDLE: This Allis-Chalmers plant, one of the most needed in the U. S. defense program has been idle since Jan. 22. America is struggling to expand its production. In addition, Reynolds Metals Co., Inc., is building new plants to help increase aluminum production. Both firms have poignantly needed production equipment on order with Allis-Chalmers. Both firms are being held up—and the aluminum bottleneck gets no wider.

Steel companies pressed to turn out steel as quickly as possible are biting their nails, too. Carnegie-Illinois Steel Corp. has switch gear equipment on order with Allis; Bethlehem Steel Co. has electrical equipment, as does American Rolling Mill Co. and American Steel & Wire Co.; Republic Steel Corp.'s expansion urgently requires a synchronous condenser and other electrical equipment; and Mesta Machine Co. wonders when it will get its generators.

Switch gear units are on order for practically all of the U. S. Navy Yards. The huge defense program undertaken by General Motors is all practically affected by lack of Allis-Chalmers products from electrical equipment to generators for mine sweepers on order.

Hercules Powder, giant pro-



84-THE IRON AGE, March 27, 1941

ducers for defense, await steam turbines. du Pont, too, producing armaments, should have its electrical equipment which stands idle in Milwaukee. And National Lead Co. sees no work done on its condensers. Even that vital artery which many military experts look upon as the No. 1 lifeline of the United States—the Panama Canal—has a big order for pumps tied up in the labor tangle.

As for the destroyer program, which is second to none in importance, the staggering total of 25 destroyers—scheduled for completion about June—is stopped. Four builders—Seattle-Tacoma Shipbuilding Co., Bethlehem, Pusey & Jones, Los Angeles Shipbuilding Co.—are all awaiting destroyer turbines. It takes little imagination to picture what this delay will do to our avowed purpose and necessity of launching a wave of ships to face totalitarian threats.

Other government defense priority orders which now only lie and wait are switch gear units and hydraulic turbines for Boulder Dam, generators for TVA, blowers for Carbide & Carbon, hydraulic turbines for South Carolina Public Service Corp., which will be used to service U. S. Army training camps—and a great number of other public utilities which

### Coming Events

March 17 to 22—Oil Burner Institute meeting, Philadelphia.

March 25 to 29—American Society of Tool Engineers, Machine and Tool Progress Exhibit, Detroit.

April 16 to 18—Electrochemical Society, Inc., spring meeting, Cleveland.

April 23 to 25—Concrete Reinforcing Steel Institute, annual meeting, Hot Springs, Va.

April 23 to 25—Open Hearth and Blast Furnace Committees, American Institute of Mining and Metallurgical Engineers, annual meeting, Chicago.

May 1 to 2—The Galvanizers Committee, annual spring meeting, Pittsburgh.

May 8 to 9—National Metal Trades Association, annual convention, Chicago.

May 12 to 15—American Foundrymen's Association, annual meeting, New York.

May 22—American Iron and Steel Institute, annual meeting. Waldorf-Astoria, New York.

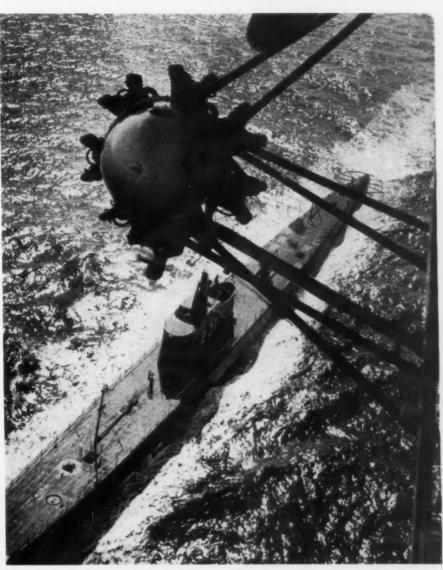


Photo by International

AIR AND SEA ARMS: Shown in this striking photograph is the new U.S. submarine Triton, as seen from the Navy Blimp G-1 during a recent cruise off Barnegat, N. J. One of the airship's motors appears in the upper section of the picture.

are important to our preparedness, as the industrial and military call for more and more power increases daily.

This, then, is just a sample of what has happened to our defense production by a strike in one single company. The nation has been sold on its top emergency being all-out defense of our own shores as well as aid to Britain. Surely, anything which can interrupt the progress of this program must have all-important justification behind it.

What then lies behind the Allis-Chalmers strike? What are the issues of a labor disturbance, which in the words of one company official "has more completely sabotaged preparedness than the worst bombing"? Is the company exploiting labor-or is labor exploiting itself and the defense program? Apparently, the union actually seeks no wage increases and has no major grievances, for the company admittedly has lived up to its union contract. What the union does seek is a closed shop, and according to Max Babb, Allis-Chalmers' president, the strike is probably being used as a "test case," involving the national defense emergency, to gain a union organizational advantage.

Nub of the controversy is the union's demand for a contract containing a referee clause which it insists is a "union security



UNION NOW: The plane in the background, already famous for its skybattles over Europe, is a British Hurricane fighter. In the foreground, still to win its spurs, is the American Tomahawk I fighter plane (this photograph was taken in England).

clause." The clause is ambiguous enough to permit a referee, if so inclined, to interpret the entire contract as assuring the CIO affiliate of a closed shop. When the company asked Msgr. Francis J. Haas, special federal conciliator, if the clause did or did not guarantee "union security," the priest replied, "That would depend entirely upon the referee." Such a clause would enable the union to require the company to discharge any man who is not a member in good standing of Local 248, United Automobile Workers of Allis-Chalmers Mfg. Co. (CIO).

This would amount to giving the union control of production, and the company cites 18 work stoppages before the strike was called as evidence that this would be done. The company has refused to accept the clause which would leave the decision of fundamental policies to the personal preferences of a referee on the belief that this would throw both company and employees on the mercy of the union.

Tracing the negotiations and ramifications of this strike as typical of labor disturbances now current in the country provides some startling revelations. They parallel, according to Allis-Chalmers' president, the evidence submitted by former Ambassador Bullitt before the House Judiciary Committee regarding similar conditions in France before its collapse.

For instance, some of the claims advanced in this case seem ludicrous, would actually be laughable if they were not such a serious slap at the public's political and social-economic consciousness, as well as being indicative of subversive influences abroad at this time.

For example: both company and union has complained of unfair labor practices to the Wisconsin Employment Relations Board. (Wisconsin, so far as is known, is the only state which makes it legal for employer as well as employee or union to seek redress for unfair labor practices.)

The union had said, in its negotions for a new contract, that the company would have to "fire" all disrupters." In his official testimony before the Wisconsin board on Mar. 19, the president of Local 248 defined in these terms a "disrupter" as anyone who:

- 1. Wears an AFL button while working in the shop.
- 2. Says with a scowl that he doesn't like Local 248.
- 3. Says the leaders of Local 248 are communistic.
- 4. Says the leaders of Local 248 are radical.
- 5. Says the leaders of Local 248 are very unreasonable.

The fine difference between a good union man and a disrupter mentioned in point No. 2 was expanded by the leader in his testimony by declaring that if a man smiled when he said "I don't like Local 248," it was all right, but if he made the same remark with a scowl he was a disrupter.

Union leaders told Allis-Chalmers officials that they wanted, among other things, "a substantial wage increase." When asked what a sub-

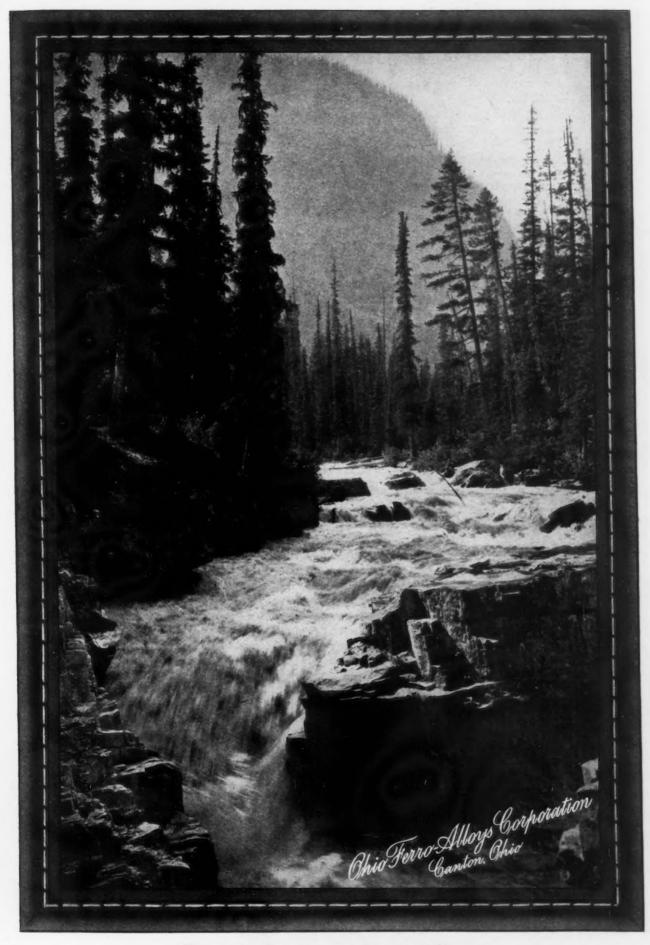
stantial wage increase would be, the union leaders countered with "you tell us" and refused to state specifically.

Called to Washington by the OPM to effect a settlement in the interest of defense, the company suggested that it would agree to insertion in its own contract of the General Motors' "referee clause" which General Motors' union contract contains. A member of OPM said the clause was "too fair," that Allis didn't deserve such a clause since it was already suffering a strike. Company representatives said they shouldn't be penalized by getting an "unfair" clause in their contract simply because a strike had been called, and the OPM official answered, "Let's not talk any more about it."

Finally, negotiations were concluded in Washington on Feb. 15, with the understanding that the government would not support the strike on the grounds of the union getting a contract device to make a man's job dependent upon union membership. In fact, Sidney Hillman, member of OPM, in the presence of William S. Knudsen and union and company representatives, presented a referee clause (which the company claimed was ambiguous) with the following statement in writing (to clear up the ambiguity):

"In the interests of National Defense, I have recommended on behalf of the OPM that this clause be accepted by the company and the union with the understanding that it is not to be considered or used as a device to promote a closed or all-union shop or to make a man's job dependent upon union membership."

This recommendation was fully accepted by all representatives at



Nature in the raw may be magnificent.

Through our careful selection and refining process, the elements of Nature become our high grade Ferro-Alloys for your use.

the Washington meeting and was to be submitted to the local union for ratification two days later so the plant could be immediately reopened.

But when union representatives showed the clause to Ed Hall, an international officer, he said, "Why you haven't got any 'union security' clause here." Consequently the Feb. 15 settlement was never sub-

mitted to the local membership and in the words of Knudsen, "The boys thought up a new one on the way home."

And, despite the fact that all hands agreed to the clause, and despite the fact that it was never submitted to the local for a vote, the OPM has not insisted that its settlement be followed.

Since the union refused to stick

to its decision to abide by the original clause proposed by Hillman on Feb. 15, Hillman, Knudsen and other Washington officials have offered the company their personal assurances that the clause should not be interpreted by the referee as a union security agreement, but they are unwilling to put their assurances in a form that would legally and effectively bind both parties. Which all adds up to the fact that the company is urged to accept the referee clause and leave entirely up to the referee vital policy decisions.

Going back to the case before the Wisconsin Employment Relations Board, which has been running concurrently with the national negotiations, the charge has been made that the union's strike vote was illegal-in short that it was a trumped-up case. The company claims that 2000 less votes were actually cast than the union Union charges that the claimed. company count was false because street cars passing in front of the union headquarters' doors kept voters hidden from a checker who stood across the street.

So, throughout the negotiations and complaints run the charges that the union is Communist-controlled; that a man wearing an AFL button in the shop or a man wearing a CIO button on the seat of his pants undermines Local 248; that employees, generally, are not in favor of the strike and would like to return to work; that the entire strike is part of a general Communist sabotage movement and that the Wisconsin CIO is directed by that party; that Local 248 has a "goon squad" which splashes paint on employee homes, badgers and even physically abuses any employee with the temerity to criticize the union or suggest he would like to go back to work.

In the meantime, employees have been without work for over two months . . . Allis-Chalmers' plant has been kept in apple-pie order and is ready to resume production on a moment's notice . . . new plate and tank shops have been built and are ready for production . . . engineering has gone ahead full steam . . . equipment is ready to move . . . but the strike continues and over 1000 employees have gone on relief, and Uncle Sam's production for defense is crippled throughout the country.



FORMERLY
40 to 50 oz. per br. with
air tools

METAL REMOVED

80 to 90 oz. per br. with Rotor air tools



Tools were beavy and slow!

The air tools used by this manufacturer of valves and pipe fittings were several years old. They weighed 15 lbs.! (A modern Rotor of equal capacity weighs only 9¾ lbs.) Tools were operating at 3400 R.P.M. with vitrified wheels. There was plenty of air to provide 85 lbs. pressure at the tools.

Changed wheels. I suggested use of modern Rotor "Powerplus" Air Grinders with high-speed bonded wheels instead of the vitrified wheels. Boosted speed to 6000 R.P.M. which was O.K. with the Safety Code.

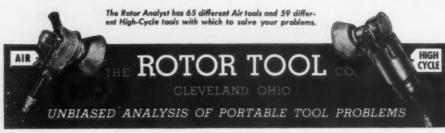
A practical, unbiased Rotor Analyst on the job, showing how a modern, Rotor Air tool doubles production.

Doubled production. Brought in a trial grinder. Took off my coat and showed them how this highspeed, light-weight tool makes the sparks fly. (Photo shows me hard at it.) Boosted metal removal from 40-50 oz. per hour to 80-90 oz. per hour—about twice as much.

They've changed over entirely to Rotor "Powerplus" Air Grinders.

Air or High-Cycle. I'd bepleased to give you practical help to study your portable tool operations and develop faster production and lower costs. I can bring in tools, gauges and all necessary equipment to demonstrate either Air or High-Cycle tools. I'm practical and I'm unbiased.

—THE ROTOR ANALYST



# ELECTRIC WELD TUBE MILLS

McKay Tube Mills—built in a complete size range—all possess certain characteristic design features which have proven of definite value under actual production conditions. We list a few of the outstanding features:

single Unit Construction: Forming Units—Welder—Flash Trimmer—Sizing and Straightening Units and Cutoff are mounted on a one piece welded bed plate, heavily reinforced—with the accurate alignment shoulders required—permanently machined onto the top surface. This makes the machine an entirely self-contained unit, with none of the field alignment problems which occur where separate units are used.

McKAY FORMING ROLL DESIGN: Maintains accurate seam alignment, necessary for good seam weld. It also produces a smooth tube, with size maintained closer than commercial tolerance requirements.

**CENTRALIZED CONTROLS**: Heat, speed and pressure controls placed for maximum convenience of operator.

ROTARY TRANSFORMER TYPE RESISTANCE WELDER: McKay-AmerTrans. construction gives 92% to 95% power factor—efficiency at welding point 90 to 95%—accurate heat regulation—maximum accessibility of electrode rolls without disturbing

**CUTOFF**: High speed rotary head or rotary saw available, to suit requirements.

QUICK CHANGE-OVER: Actual production conditions prove that a complete change-over from one size tube to another can be made in less than three hours by regular operator and helper. This is because McKay construction includes enough auxiliary equipment so that units may be interchanged without disturbing vital settings.

McKAY "McKROMETER" ROLL PRESSURE ADJUSTMENT: (Covered by U. S. Patent 2,122,615.)

Allows actual recording of correct pressure settings at each pass for each diameter and gauge tube.

FLOOR SPACE REQUIREMENTS: Single unit construction cuts floor space requirements in half. Machine illustrated will make up to  $1\frac{1}{2}$ " tube—space required 21' 0" by 6' 0"

The above represents only a few of the advantages of McKay equipment. Call on us for complete information, samples and demonstration.

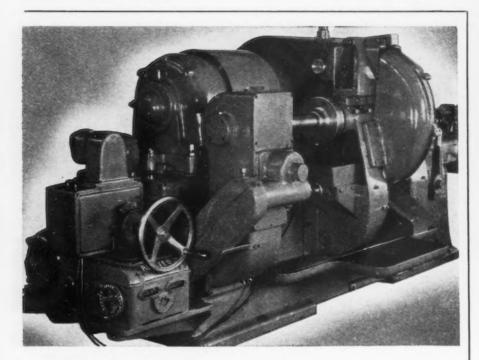


# Deals Between Steel Companies Aid Defense

Pittsburgh

• • • Steel companies are going to much greater lengths to expedite American and British defense steel production than is generally supposed. Deals have been made between various companies entailing considerable expense and effort, yet this detail is taken as a matter of course in an "all out" effort to be in a position where no material slated for defense purposes is lacking.

Three large steel companies in this district have private arrangements with a non-integrated mill here whereby ingots are furnished, rolled down to slabs or billets, and returned to the steel companies for final processing. In some in-



# RIGHT SPEEDS TAKE "CAN'TS" OUT OF MACHINE PRODUCTION

Accurate finishing to length of the four ends of universaljoint crosses is done easier and faster on this grinding machine because of the speed adjustability provided by the REEVES Variable Speed Transmission. With the aid of REEVES Speed Control, 500 crosses are ground hourly. Merely by turning a handwheel, grinding speeds are varied according to changing diameters of grinding wheels, and work range is greatly increased. You can step up the output of any driven machine by installing a REEVES Speed Control unit. Find out how inexpensively you can do this in your plant. Seasoned engineering service available. Write today for 124-page book G-397, describing the complete REEVES line and its use in 18,000 plants.

REEVES PULLEY COMPANY, Dept. I, COLUMBUS, INDIANA

# REEVES SPEED CONTROL



By Wide World Photos

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DOWN THE SAFETY CHUTE: C. A. Higgins, president of the Hercules Powder Co., shows in this Navyapproved picture how employees at the new \$44 million ordnance works at Radford, Va., can use a safety chute. The plant was scheduled to begin production this week.

stances this non-integrated mill is also rolling bars or large rounds for ammunition purposes.

Recently during a breakdown of equipment at one steel plant, a substantial tonnage of ingots was hauled a distance of more than 400 miles and processed in this district so as not to slow up the defense program.

One steel company here is also utilizing a portion of the steel making facilities of another plant in order to expand its finished steel production, thus supplementing the complete operation of its own steel works department.

These arrangements many times involve the outright purchase of ingots or billets at an agreed price



# REDUCED SCALE OF PRICES ON PRESENT STANDARD TOOLS

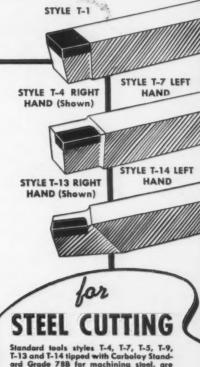
Six months ago . . . a NEW plan introduced ... a line of standard, "universal-use" Carboloy tools, produced in large quantities—low priced—and maintained in stock for prompt deliveries.

Today—with a record of thousands of tools shipped from stock weekly for 24 weeks in continuously increasing quantities—that plan has proved itself an outstanding success and the answer to the pyramiding demand for carbide tools.

To further extend the benefits of standardization for the user we are now supplementing the original 5 standard styles with 5 new styles—in 21 sizes. These are also being produced in large quantities to be stocked for prompt delivery. They consist of right- and left-hand offset turning and facing tools, and a "rounded" nose, two-way turning tool.

Coincident with this expansion—prices of the original 5 standard tools have been revised. Reduced prices are in effect for the entire standard tool line with the exception of minimum prices on sizes up to 34" square. Quantities necessary to obtain minimum prices have been reduced from 50 tools to 10, and, in some cases, 5 tools. Substantial reductions affect price per tool in quantities of 1, 2-4, and 5-9.

With these new, lower prices, and this augmented line of 10 standard styles-NOWmore than ever before, you will find Carboloy Standard Tools your answer to carbide use . . . applicable to at least 80% of all turning, facing, boring jobs on ALL metals and nonmetallics! Write for new catalog GT-129





CARBOLOY COMPANY, INC., 11153 E. 8 MILE STREET, DETROIT, MICH.

Chicago • Cleveland • Los Angeles • Newark • Philadelphia • Pittsburgh • Worcester, Mass.

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CARBOLOY STANDARD TOOLS

CATALOG

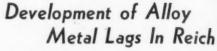
Send for New Catalo GT-129

or sometimes include the supplying of raw materials for steel manufacture, the conversion being paid for at an agreed amount.

It is known that in all cases the steel companies involved have closely studied the costs and in view of the nature and disposition of the material only a nominal profit or "overhead" fee is being charged by the non-integrated mill for doing the conversion. On the other hand, the major steel com-

panies are making their contribution to defense efforts by taking this method of completing orders which require a payment of a much larger sum than would be expended in their own plants were their equipment not fully engaged.

This type of "farming out" among steel companies is not necessarily restricted to the Pittsburgh district but is being carried out in other areas as well.



Washington

• • • Reports published in the German daily press and trade journals point out that political and military developments during the past year have notably strengthened the position of the Reich's iron and steel industry, the Metals and Minerals Division, Department of Commerce, reports.

The continental ore situation, it is stated, has been changed to the great advantage of Germany as a result of the Norwegian campaign, the acquisition of Lorraine and the re-establishment of the customs' union between Germany and Luxembourg. At the same time the ore reserves within the Reich itself have been developed to a point where it is possible that the goal set by the Four-Year Plan for the annual exploitation of about 25,700,000 metric tons of ore has been reached.

Coal, it is reported, is being canalized to the domestic metallurgical industry at the expense of all other consumers and labor has been diverted to this activity from less essential branches of production. However, little progress has been made in Germany in the last year in the development of alloy metals, according to available information, and in this field substitutes have had to be sought.

# AFL Gets Contract, CIO Pickets Close Plant

Valparaiso, Ind.

• • • Although the AFL has a contract recognized only three weeks ago by the NLRB, CIO pickets caused a complete shutdown of the Indiana Steel Products Co. here. AFL claims membership of 130 to 150 of the 200 total employees and also cites the labor board's recent ruling that its contract is legal and runs until Nov. 15, 1941. CIO counters with the charges that AFL is "non-existent" at the plant, a leader saying that no employee is paying dues to AFL and at the same time stating that about 190 are paying dues to SWOC. Both factions are awaiting action from the regional office of the NLRB.





# A brand-new plant—and a brand-new idea in pickling

The new idea in pickling at the Warren, Ohio, plant of Copperweld Steel Company is carried out as follows:

Two parallel tanks are used. Billets are loaded into one tank which is then filled with dilute sulfuric acid for the pickling operation. During this time, the other tank is loaded with billets.

When the pickling in the first tank is complete, the acid is transferred by the Durimet pump to

DURIRON COMPANY Equipment for metal cleaning: CENTRIFUGAL PUMPS ... VALVES PIPE and FITTINGS . . . EJECTORS **HEAT EXCHANGERS . . . SIPHONS** HEATING and COOLING COILS CIRCULATING STEAM JETS . . . TANK

**OUTLETS...SPECIAL EQUIPMENT** 

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the second tank. Billets in the first tank are washed, removed and the tank reloaded.

A DURIMET (stainless steel, especially resistant to weak, hot sulfuric acid) self-priming pump, DURIMET Type 602 Lubricated Valves and DURIMET Fittings handle the acid from one tank to the other.

The Type 602 Valve has a Durimet body with a Duriron plug. The Duriron plug is not only highly resistant to the hot acid, but also to the abrasiveness of scale in pickling solutions.

If you have a new idea or operation in pickling, we shall be glad to help you in determining the right corrosion-resisting alloy and equipment for the conditions to be encountered.

> Write today - let us recommend the proper alloy and equipment.

# THE DURIRON COMPANY, Inc. North Findlay Street Dayton, Ohio

# Sharp Wage, Price Rise Seen By Editor

• • • Wage and price inflation as a government sponsored policy was predicted by John H. Van Deventer, president and editor of THE IRON AGE, who last week addressed the annual meeting of the Hartford County Employers' Association at Hartford, Conn. "Right at this moment," said the speaker, "there is a concerted and comprehensive movement to force by strike or threat of strike, a wage increase varying from ten to 25 per cent. If this is successful, it will mean that the \$7 billions that American taxpayers have put up willingly for aid to England will shrink in buying power to about 5½ billions, and that we will have to provide some

\$5 billions more to secure the anticipated results from our own \$30 billion defense outlay.

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This endeavor to force a higher wage level, in the opinion of the editor, is preliminary to the conviction that the administration, in spite of assertions to the contrary, will shortly sponsor general or selective price rises in goods and commodities under a controlled inflationary plan. This assumption is based on the belief that before we get through spending, our National debt will be between \$80 and \$100 billion.

"This huge National debt will eventually have to be liquidated," said Mr. Van Deventer, "and since there are no indications whatever of a policy of retrenchment even in ordinary expenditures, there will be but two ways to do it. One way, the hard way, will be through taxation. Taxation almost to the point of confiscation that will extract from the individual in concealed as well as direct taxes at least 50 per cent of his earnings for years to come instead of the 25 per cent that the average man is paying at present. That is the hard way because the tax base will have to be broadened; it will have to fall on small wages and small incomes because there are not enough big ones to answer the purpose even if Government took 100 per cent of them. And this, of course, would be politically unpopular.

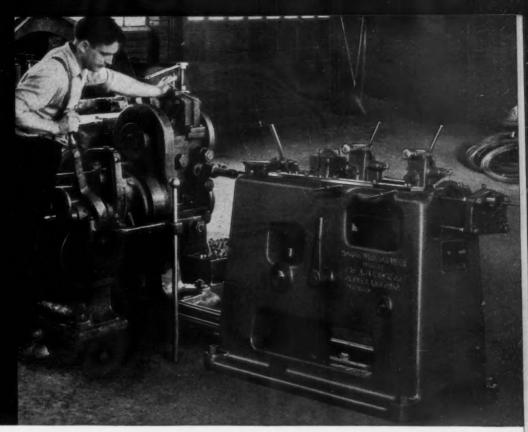
"The second and the politically easy way to do it is through inflation. Raise the general price level 25 per cent and an \$80 billion national debt automatically becomes reduced to \$60 billion in terms of the buying power of the debt dollar. Ask yourself how long and how hard it would be to knock \$20 billion off of the national debt through increased taxation?

"Industry is already experiencing another inflation," said the speaker, "namely the inflation of man-power.

"I know of one industry in the machinery field in which employment has been expanded roughly from 5000 to 25,000 workers. Normal demand, both domestic and export, for the product of this industry could be adequately filled, during any normal year, with 5000



Lower Costs-Uniform
Accuracy - Increased
Die Life in Cold
Heading Achieved
with
AJAX-HOGUE
WIRE DRAWERS



The Ajax-Hogue Wire Drawers used in conjunction with cold headers make it possible to produce highest quality cold headed products from hot-rolled stock instead of cold-drawn wire, thus saving the difference in the cost of the two materials. Stock cold-drawn on the Ajax-Hogue Wire Drawer is more accurate than the variation allowed by standard commercial tolerances, and does not vary in size from coil to coil. The wire enters the header straight with a good clean coating immediately after drawing and before age hardening sets in, which makes for easier heading with a resulting substantial increase in heading die life, especially on difficult, close limit products.

All of these factors contribute to the production of a higher quality finished product, at a lower cost, in the production of bolts, screws, and other cold headed products. If you operate cold headers, write for Bulletin No. 111.

Cold draws, straightens and shears off, hot rolled coiled stock into straight, accurate blanks of uniform length, from 6 inches to 15 or 20 feet. Diameter 3,16 to 3/4 inch. Write for Complete Information.

NEW AJAX
WIRE DRAWING
STRAIGHTENING
AND
CUTTING OFF
MACHINE

AJAX ALSO
BUILDS CONTINUOUS
BAR DRAWING AND
STRAIGHTENING
MACHINES FOR ROUNDS,
HEXAGONS, SQUARES.
Capacity 1/2" to 11/4".
Bulletin No. 115.

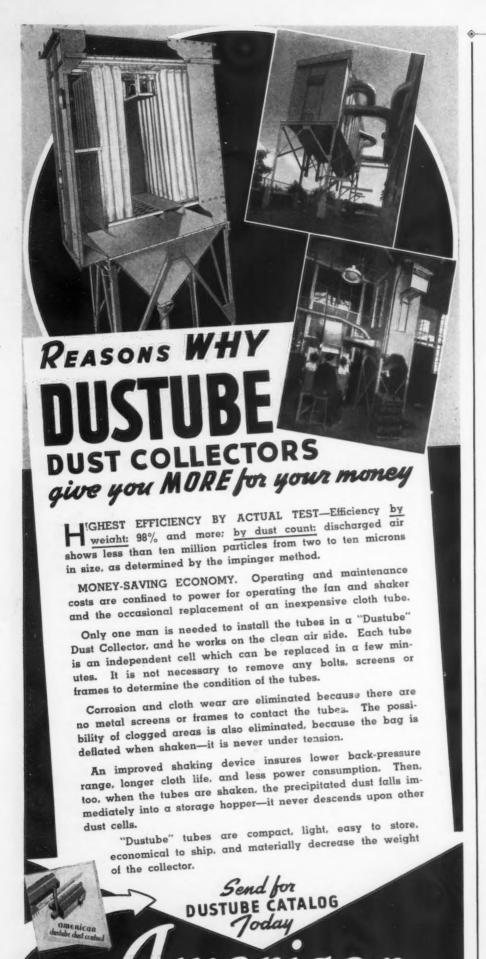
THEAJAX

MANUFACTURING COMPANY

621 MARQUETTE BLDG

EUCLID BRANCH P.O. CLEVELAND, OHIO

201 DEWART BUILDING



workers. The increment of 20,000 represents the effects of the hypodermic administered by Mars, the God of War.

"These additional workers did not come from the industries into which they have gone. They came from the highways and byways; they received intensive training in skills new to them; they are enjoying wages better than they have earned in their lives before and perhaps better than many of them will ever earn again.

"After the unnatural demands of war and defense have passed, you will not need these men in your plants. You will be lucky to be able to keep as many men employed as were there before the great influx began.

"Accentuating this situation will be return to us from abroad of the goods and commodities, or their counterparts, which we supplied to friendly countries under the terms of the "lend-lease" bill. What effect upon the steel industry of America, or our machine tool industry, for example, measured in labor jobs will be had by the return of these counterparts made with foreign labor?

"When we begin to get back airplanes from England, for example, at the rate of 1500 to 3000 per month, in return for those that we have furnished them, what will

WATCH YOUR WORDS: Navy have received new inter-office words of caution against revealing



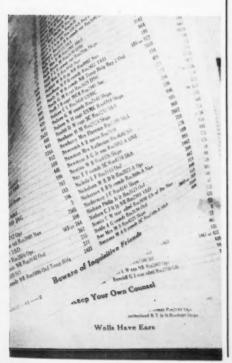
this do, do you think, to aircraft employment in this district?

"Now, of course, any practically minded man knows that it will not be done that way. He knows that it would be cheaper and better for us to forget repayment in kind or any other kind and to torpedo the ships that were returning this material to us, if necessary, rather than to glut our markets with surplus commodities and thus depress whatever employment and wages will be available.

"But even aside from this, and avoiding this drawback, it will be impossible for you employers, through normal demand, to maintain your present working forces through your own sales efforts. And this means one of two things. Either we shall see a resurrection of the WPA and Government relief on a grand and glorious scale, or we are going to see Uncle Sam prolong his role as the chief customer of American industry and overlapping the defense program with a government financed reconstruction program. I believe it will be the latter.

"In either case, this means an even higher tax load and an additional urge to price inflation as well as more regulation of business and industrial activities—and activities of labor—by the Federal Government.

Department employees at Washington telephone directories sprinkled with naval secrets.





# Electro Coated Thomastrip Meets New Applications

THOMAS has centered its attention on developing cold rolled strip steel to its most advanced state. The complications of painstaking processes are considered insignificant when higher quality is the reward.

Gauges to eliminate guesswork, fingertip controls to maintain precision, as well as other methods for more exacting command over production have led to quality improvements in Thomas electro coatings. Hence, we offer to manufacturers who use electro coated Thomastrip new opportunities for reducing costs and improving products.

BRIGHT FINISH UNCOATED OR ELECTRO COATED WITH NICKEL, ZINC, COPPER, BRASS

# THE THOMAS STEEL CO.

SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEE

WARREN, OHIO

# Publicity May Be Mediation Board's Strongest Weapon

Washington

• • • The Administration's new 11-man super-mediation board faced the difficult assignment this week of doing what the combined facilities of OPM and Labor Department mediation machinery have found impossible to do in the past two months—bring a prompt and satisfactory termination of strikes in defense industries.

Established under the Office of Emergency Management, the new defense mediation board under the terms of the executive order signed by the President will handle any dispute which "threatens to burden or obstruct the produc-



"Monel" is a registered trade-mark of The

International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

# Mediation Board Seen Lacking In Authority

• • • Critics of the 11-man Defense Mediation Board—questioning its efficiency to deal forthrightly with strikes threatening an all-out defense effort—this week were already complaining that the board is:

1—Too unwieldly to act promptly in settling strikes. Speed of settlement is now vital.

vital.

2—Too dependent on Labor Secretary Frances Perkins, whose success in ending labor disputes has not been spectacular. (Secretary Perkins is to hand disputes to the board after her conciliation service has failed.)

3—Too completely a device (despite some of the distinguished, able men among its members) to quiet the popular demand that "something be done" to curb defense plant strikes and to head off passage of laws limiting the right to strike during the emergency.

4—Too lacking in authority.

tion or transportation of equipment or materials essential to national defense" and which cannot be adjusted by the Labor Department's conciliation service.

After the Secretary of Labor has certified a dispute to the board, an indication that the efforts of her conciliation service have been unavailing, the 11-man agency will attempt settlement by aiding in the negotiations. Specifically, the board will:

1. Provide the medium for voluntary arbitration on request of both parties to the dispute, and provide impartial arbiters;

2. Assist in establishing methods for preventing further disputes between opposing factors parties;

3. Investigate issues, receive testimony, conduct hearings and, if deemed desirable, make public their findings; and

4. Request the National Labor Relations Board to expedite a determination of a proper bargaining agency in cases where the controversy relates to this matter.

Members named to the board include:

Representing the public—Clarence A. Dykstra of Wisconsin, president, University of Wiscon-

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To HELP KEEP bearing wear and care out, always put Hyatts in. Hyatt Roller Bearings hold shafts, gears, and wheels in perfect alignment . . . make life easy, smooth, and long, for all mechanical equipment. Design them into the machines you build; look for them in the equipment you buy. Ask for further details. Hyatt Bearings Division, General Motors Sales Corporation, Harrison, N. J., Detroit, Pittsburgh, Chicago, San Francisco.

ROLLER BEARINGS

OUIET

sin; William Hammatt, New York patent attorney; and Frank P. Graham, president, University of North Carolina.

Representing employees George Meany, of New York, AFL general secretary; George M. Harrison, of Ohio, president, Brotherhood of Railway and Steamship Clerks; Philip Murray, of Pennsylvania, SWOC chairman; Thomas Kennedy of Pennsylvania, vicepresident, United Mine Workers of America.

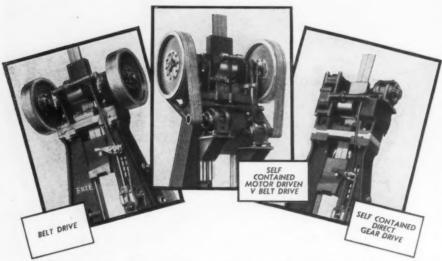
Representing employers - Walter C. Teagle, of Connecticut, former president, Standard Oil Company of New Jersey; Roger D. Lapham, of California, president, American Hawaiian Steamship Company; Eugene Meyer, of the District of Columbia, publisher of the Washington Post; Cyrus Ching of Pennsylvania,



TAKING THE BUMPS: This bantam has just topped a rise at Fort Sixth Cavalry.

BOARD HAMMERS

TYPES OF DRIVE ON



Erie Board Drop Hammers, made in rated sizes from 600 to 10,000 pounds inclusive, are available with drive features to suit any condition. For forge shops that have an existing line shaft belt drive, the Type F Erie Hammer is recommended.

The Type FV Erie Hammer is driven by two motors mounted on the rear of the frames and connected to the pulleys by V-belts. The motors are isolated from operating shock by rubber mountings and at the moment of impact their weight is carried by the belt pull. This type of drive is low in first cost and maintenance.

> The Type M Hammer, shown at the right, is driven through fully enclosed, heat treated gearing from a single motor.

> Bulletin 328 describes these Erie Board Drop Hammers in detail; write for your сору.

# ERIE FOUNDRY COMPANY ERIE, PENNSYLVANIA, U.S.A.

CHICAGO INDIANAPOLIS

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vice-president, United States Rubber Corporation.

In the original White House statement announcing the appointment of the new board, Mr. Ching was inadvertently listed as vicepresident of the United States Steel Corp. This was subsequently corrected, however, and Mr. Ching's proper identification with the United States Rubber Corp. was announced.

Creation of the new mediation board follows a rising tempo of strikes in defense industries which at first encountered Administration statements minimizing their effect upon the armament program. President Roosevelt's assertion less than three weeks ago that, while troublesome, the strikes were not substantially retarding defense production, finally gave way to a radio statement on March 8 that the determination of this country in its defense effort "must not be obstructed by unnecessary strikes of workers." The appointment of the mediation board followed several days later.

OPM Director General Knudsen also conceded last week that his previous statement to Congress, in which he, too, minimized the strike situation, was a bit "premature" because of the increasing number of strikes that had broken out since that time.



Army car, towing a 37 mm. gun, Oglethorpe, Ga., headquarters of the

"Manifestly," he told a press conference, "we cannot have this going on all the time."

Mr. Knudsen did not attempt to analyze the strike situation in terms of delayed defense production but he observed that the President's March 8 statement would have a salutary effect upon the labor picture.

A review of strikes occurring in defense industry, in which the OPM and the Labor Department's conciliation service have attempted settlements, indicates that most of them can be classified as either the result of organization efforts or jurisdictional disputes, Mr. Knudsen said.

His statement that the OPM had been "too busy" to give adequate publicity to the strike picture prompted some observers to speculate that the board's power to make public findings of fact in an effort to force disputants to agree to a just settlement may be the chief weapon to be used by the board. Labor circles, however, were reported to be attaching considerable significance to the board's power to request an NLRB election. The theory advanced was that in strikes over union recognition, the management, the union, or both, frequently do not desire an election and take steps to resist it.

# 10 Million Steel Helmets To Cost Britons \$1 Each

• • • Quantity production of the new type of mild steel helmet for fire-watchers and industrial workers throughout the United Kingdom is now being speeded up. So far, more than 7,000,000 helmets of standard types have been supplied—chiefly to the fighting forces, the Home Guard, and civil defense services, but millions of fire-watchers and workers still remain without protective headgear. The hats are made of thin mild steel, usually used for kettles and saucepans. Sir Andrew Duncan, Minister of Supply, aims at producing 10,000,000 steel helmets of the approved type for the public at 5 shillings sixpence each, or just over \$1.00.



# ONLY LAPPING As Strom Does It CAN PRODUCE SUCH PRECISION

Strom Steel Balls possess a degree of surface smoothness and sphericity that has never been equalled in any other regular grade of ball. Such precision is exclusive with Strom because it can be attained only through a series of lapping operations such as are standard practice in the Strom plant.

Physical soundness, correct hardness, size accuracy and sphericity are guaranteed in all Strom Balls.

Other types of balls—stainless steel, monel, brass and bronze, are also available in all standard sizes. Write for complete details.

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STEEL BALL CO.

1850 So. 54th Avenue, Cicero, Ill.

The largest independent and exclusive Metal Ball Manufacturer







# U. S. Defense Plant Site Committee Organized

Washington

• • • • Acting under the executive order creating it, the OPM has authorized appointment of a five-man Plant Site Committee, headed by Director of Purchases Donald M. Nelson, to review and approve proposals for location by government agencies of additional plants or facilities required for defense.

The OPM announcement said that the committee will, insofar as possible with primary emphasis on expediting defense production and appropriate military factors, facilitate geographic decentralization of defense industries and full employment of all available labor.

Initiation of projects for new plants and initial suggestions for site locations will continue to be made by the Army and the Navy, the legally authorized contracting agencies.

Members of the OPM Committee in addition to Mr. Nelson are:

Clifford Townsend, special advisor on agricultural and labor matters; Eli Oliver, special assistant on labor relations; E. F. Johnson, chief, aircraft, Ordnance and Tools Branch of the Production Division; S. R. Fuller, chairman, Production Planning Board.

# Class I Railroads Spent \$429 Millions in 1940

Washington

• • • • Capital expenditures for equipment and other improvements to railway property made by Class 1 railroads in 1940 totaled \$429,147,000, the greatest amount spent in any year since 1937, the Association of American Railroads has announced. In 1937, gross capital expenditures amounted to \$509,793,000. Outstanding expenditures in 1940 were:

Freight train cars, \$189,629,000; locomotives, \$54,351,000; passenger train cars, \$18,417,000; heavier rail, \$30,473,000; shop and engine house additions and betterments, including machinery and tools, \$11,074,000.

Class 1 railroads in 1940 put 65,545 new freight cars and 419 new locomotives in service. On Jan. 1, 1941, there were 35,702 new freight cars and 206 new locomotives on order.

# Night Shift At New Buick Engine Plant

• • • Indicating "full speed ahead" or construction of the new Buick aircraft engine plant here, first construction plans included installation of lights for night work. Two shifts daily, and Sunday and holiday work are also provided for in the contract for \$2,500,000 awarded to Thorgerson & Ericksen, Chicago general contrac-tors. The contract is the largest single award ever made by Buick.

# Buick Constructs Scrap Salvage Factory

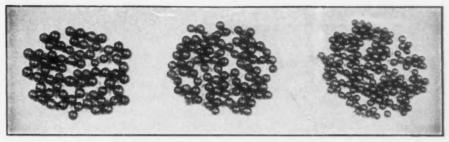
Flint, Mich.

· · · Necessity for conserving scrap materials and salvaging them according to alloy content, has resulted in construction of a salvage factory by Buick Motor division, General Motors Corp. The new building for Buick's salvage department will be adjacent to the engine, gear and axle plants, according to an announcement by Harlow H. Curtice, president and general manager of Buick.

The building involves 2700 sq. ft. of floor space and will house special machinery and equipment for reclaiming excess material from the three factories it serves. Equipment includes crushers for handling borings and "chip wringers" which wring oil and moisture from chips and other metal scraps and bucket elevators for loading. Covered loading docks along the railroad siding adjacent to the building and special loading hoppers for depositing the material on gondolas will be provided.

Other plant expansion to care for current manufacturing requirements and meet future needs has also been disclosed by Mr. Curtice. Approximately 240 ft. will be added to the final assembly line. This work, which means the addition of approximately 15,000 sq. ft. of floor space, and the construction of new conveyors, will be carried on without interrupting production.

General contracts have been awarded to Darin & Armstrong. Detroit, for the construction of a new factory building to house new car servicing and shipping facili-



# We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to Cali-

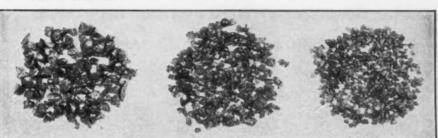
The unprecedented demand for our-

**Heat-Treated Steel Shot** and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the coun-

# HARRISON ABRASIVE CORPORATION

MANCHESTER, NEW HAMPSHIRE



JESSOP CNS

An Outstanding General Purpose High Carbon High Chromium Die Steel

Jessop CNS is a 1.50% carbon. .75% molybdenum high chromium vanadium die steel possessing good machinability, minimum size change, and toughness with remarkable wear resistance. These balanced properties make CNS an ideal die steel for general purpose work where high wear resistance

Lamination Die and Punch made from Jessop CNS combined with shock-resistance is desirable. The same hardness is developed by air hardening as by oil hardening.

If you have an application requiring extreme wear resistance, we recommend Jessop 3C oil hardening die steel. If first cost of die is of primary importance, investigate Jessop WINDSOR SPECIAL air hardening die steel. Literature on all three types of Jessop High Carbon-High Chromium die steels will be sent free upon request.

JESSOP STEEL COMPANY

537 Green Street Washington, Penna.





CARBON- HIGH SPEED STAINLESS and COMPOSITE

# Wage Demands Made On 3 Steel Companies

Pittsburgh.

• • • Philip Murray, chairman of the SWOC, has requested Republic Steel Corp., Youngstown Sheet & Tube Co. and Inland Steel Co., to meet him and negotiate written contracts, embodying a 10c.-anhour increase in wages, improved vacations and other "conditions of employment in accordance with a nine-point program." The action was authorized by presidents of 44 SWOC local unions in mills of those three steel corporations at a meeting here last week.

These are three of the companies involved in the "Little Steel" strikes of 1937. One of the

# Curtiss-Wright Orders Total \$716 Millions

• • • Curtiss - Wright Corp.'s unfilled orders on Dec. 31, 1940, had increased to \$716,971,000 from \$145,282,000 a year earlier. Personnel was increased from 12,560 to 29,332 during the year. During October and November 1940, ground was broken for four new Curtiss-Wright plants at Buffalo, Cincinnati, Columbus and St. Louis, totaling 5,635,000 sq. ft. of floor area.

issues in those strikes was the refusal of the companies to sign contracts with the union. In substance the 9-point program presented to "Little Steel" is the same as that now being negotiated in SWOC conferences with Carnegie-Illinois Steel Corp., a U. S. Steel subsidiary. In these conferences, however, changes are sought in existing contracts.

Wage conferences between Carnegie-Illinois and the SWOC were to be resumed March 24.

## Pittsburgh Steel's New Coke Plant Costs \$5,500,000

Pittsburgh

• • • Pittsburgh Steel Co.'s new by-product coke oven plant to consist of 74 ovens with an annual production of approximately 435,-000 tons of coke, will cost about \$5,500,000, according to Henry A. Roemer, president. This plant will be located at Monessen. Pa., on property recently purchased from Carnegie-Illinois Steel Corp., immediately adjoining the Pittsburgh Steel Co. works. Mr. Roemer reported a tax bill for 1940 equal to \$184.23 per employee, \$2.87 a share on common stock or \$2.40 per ton of product shipped.

Referring to prices, Mr. Roemer said, "The steel industry as a whole is cooperating with the government by not increasing the general price schedule and it is to be hoped that no deviation from this policy will be forced upon the industry by the increase of costs through influences beyond the control of management."

Net earnings for 1940 were \$1,-556,000, compared with 1939 earnings of \$564,870.



Manufacturers for Over Thirty Years

# Electric Propelled INDUSTRIAL TRUCKS

## FOR ECONOMICAL MATERIALS HANDLING

- . FORK AND RAM TRUCKS
- . LOW AND HIGH LIFT TRUCKS
- . COIL AND SHEET HANDLERS
- . LOAD CARRIERS
- . TRACTORS CRANES

Capacities 1000 to 60,000 lbs.

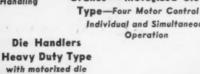


Low Lift Skid Platform Type



Fork and Ram Trucks Telescopic and Non-Telescopic for Pallet and Coll Handling







Coil and Sheet Handlers

**High Lift** 



and unloading platform



REQUEST DETAILS AND LITERATURE

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AUTOMATIC TRANSPORTATION CO.

75 W. 87th St.

CHICAGO, ILL.

# Republic Bookings Hit All-time Peak

Cleveland

••• The largest backlog of orders in its history was on the books of Republic Steel Corp. at the close of 1940, according to the annual report to stockholders by T. M. Girdler, chairman, and R. J. Wysor, president. Sales and operating revenue for 1940 amounted to \$305,293,356, compared to \$232,014,074 in 1939. Operation for the year averaged 78 per cent of capacity, with a production of 6,111,678 tons of ingots, an increase of 27 per cent over 1939.

Stressing the importance of complete co-operation with the defense program, the letter points out that among the defense materials being produced by the corporation are, electric furnace alloy steels for aircraft parts and light armor plate; light armor plate itself; cold drawn and heat treated bars for anti-aircraft projectiles; hot rolled bars and billets for shell forgings; and special steels for large gun forgings, marine crankshafts for naval vessels, and other products.

The report shows that during 1940 the corporation paid out a total of \$6,832,400 in dividends to stockholders, and set aside \$6,300,000 as a Purchase Fund to retire its 6 per cent cumulative convertible preferred stock.

At the same time, pay rolls amounted to \$97,570,848 and taxes to \$16,034,921. Provision for Federal income taxes amounted to \$8,000,000, and Social Security taxes to \$3,763,000. At the close of 1940 the corporation had 62,093 employees on its pay roll. Net income was \$21,113,507 as compared to \$10,671,343 in 1939.

During 1940 the corporation's working capital increased \$16,000,000, and at the end of the year was \$10,000,000 in excess of its funded debt. Total debt at the end of the year amounted to \$95,829,105. In discussing improvements and acquisitions, the steel executives pointed out that the corporation's capital expenditures for property account amounted to \$17,032,625 during 1940.

Included in the major expansions were the installation of three

additional 50-ton electric furnaces, which are being augmented by two similar units; increased open hearth ingot capacity at Warren, Buffalo, Chicago, Cleveland and Gadsden; increased blast furnace capacity at Cleveland and Birmingham and the purchase of a blast furnace at Troy, New York; the lease of the Clyde Coal Mines in western Pennsylvania, giving the corporation approximately 40,-

000,000 tons of high-grade coal for its by-product coke ovens.

### February Machine Tool Shipments \$52,100,000

• • • February shipments of machine tool builders comprising over 95 per cent of the industry totaled \$52,100,000, the National Machine Tool Builders' Association reports.



POTOSTC POTOSTC

### You Need BALANCE in a HOIST

balance that makes the difference between a Lo-Hed and any other hoist. In this different hoist the motor and drum are on opposite sides of the beam. The hook goes up so close to the beam you can searcely jam your thumb between. You get a compact, balanced hoist, minimum headroom, efficient spur gearing, and a sturdy frame, plus all the practical features a hoist should have. A Lo-Hed is worth a few dollars more but it will make a difference in your operating and maintenance costs. Look at a Lo-Hed and you won't have to look further. Write for Lo-Hed catalog today.



LOOK AT THE BALANCED LO-HEDI
It Costs Less to Operate—All gears are
efficient stub-tooth spur gears running in
a sealed oil bath . . gear shafts and
trolley wheels are equipped with heavyduty ball or roller bearings.
It Costs Less to Maintain—Sturdy construction . . seldom, if ever, requires
removal from rail . . covers of controller, motor, drum and gearing are easily
removed.

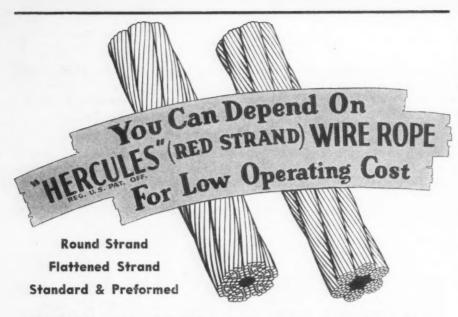
AMERICAN ENGINEERING CO.
2410 Aramingo Avenue, Philadelphia

Please send me your complete catalog of LO-HED HOISTS.

Ask your representative to get in touch with me promptly.

Name		*			*		*	*	*	*		*	*		*	*	0.		*			
Compa	ny		. ,	×	*	*				*								*				
Street	Ad	ldi	e	18		×		*		×	*	*	*	*	*		*	*	*	*	*	*

The Lo-Hed Hoist is applicable to any monorall system — There's a balanced Lo-Hed electric hoist for every purpose
OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE DECK AUXILIARIES, HELE-SHAW FLUID POWER
Look in your Classified Telephone Directory under "A-E-CO. LO-HED HOISTS" for your nearest representative



WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

Made Only By A. LESCHEN & SONS ROPE CO. Established 1857
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# FUMP Every Tool Engineer Tool Recognizes

Every tool engineer recognizes the coolant pump as an important part of his tooling-up plans.

Many tool engineers prefer Ruthman Gusher Coolant Pumps because these pumps need no priming and are ready to deliver the desired volume at the snap of the switch. There are no packings to fuss with, and grit cannot clog the Gusher impeller Coolant Pump. That means there will be no interruption in production so far as coolant supply is concerned.





# Workings of Priorities System Are Explained

• • • The workings of the priority system are explained in Circular No. 2 issued by the Division of Priorities, Office of Production Management. Full instructions as to the procedure to be followed by prime contractors or subcontractors in obtaining priority or preference ratings are given in this circular, which follows:

"The priorities system is intended primarily to implement the purchasing and production of defense material. Certain important civilian projects and foreign orders may be given priority aid, where speed is essential, and civilian needs will have to be carefully balanced with defense needs at all times.

"The principal administrative mechanism in the operation of this system is the 'preference rating certificate' which is the notice to a supplier that the production of certain material is to be given preferential treatment, if necessary to meet delivery dates. This is to be done without prejudice to contracts and orders bearing equal or superior ratings, but by withholding or deferring deliveries on other contracts and orders.

"In order to preserve its effectiveness, the preference rating certificate will be used only when an alternative solution is not readily available. Therefore, the Priorities Division will attempt to obviate the use of priorities, wherever possible, by working in close collaboration with the Division of Production and the Division of Purchases, with a view to finding alternative solutions.

"In special situations, blanket preference ratings will be made available to cover the defense requirements of a particular producer for specifically designated types of material. This will be done by means of a general preference order which may be photostated by the user and given to the supplier concerned. The producer given the benefit of such an order will be required to keep a careful record and report the amount any type of material purchased under such general preference orders.

"In addition to the preference rating certificate, certain scarce raw material will be placed under industry-wide priority control and allocation. In such cases, specific orders from the Priorities Division which modify the effect of the preference ratings previously issued will supersede the ratings.

"Ratings and Order of Preference.—The order of preference is indicated by the following symbols in order of precedence: AA, which is reserved for emergencies of an exceptional nature; A-1-a, A-1-b, A-1-c . . . A-1j; A-2, A-3 . . . A-10. As between contracts and orders in the same sub-division (as A-1-c). except as otherwise specifically directed by the Director of Priorities, the date of delivery contracted for will determine the order or precedence. When delaying orders due to priority requirements, suppliers should adjust them in inverse ranking-first, those with no rating, then those with lowest rating, etc.

"Plan of Organization. - The

# British Design Bomb Shelter For Indoors

London

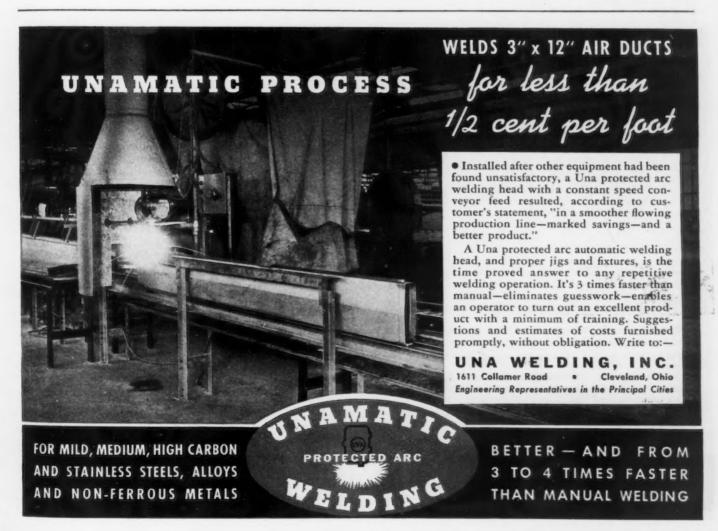
• • • Herbert Morrison, Minister of Home Security, has announced that a satisfactory design for an air-raid shelter within the home has been achieved. Priority in distribution will be given to a few selected areas.

This new indoor shelter is built of steel, and is the height and shape of a table, 6 ft. 6 in. long and 4 ft. wide. The top is a sheet of steel; the floor is sprung to make a comfortable base for a mattress. The sides, of steel mesh, are easily detachable, and when they are removed the top of the structure can be used as a table. The shelter is to be supplied in sections, for assembly by the householders themselves in accordance with simple instructions.

The new shelter provides perfect cover from the debris of a two or three floor house. Army and Navy Munitions Board pursuant to direction from the Army and Navy Joint Board will determine the relative importance of military items, such as guns, tanks, airplanes, ammunition, etc. On the basis of this determination, the contracting officers of the Army and Navy, coordinated by the Army and Navy Munitions Board, will administer the assignment of preference ratings to prime U. S. Army and Navy contracts for a selected list of critical items.

"This selected list, called the 'Priorities Critical List,' is made up primarily of military items and parts necessary to complete such items which usually have no direct counterpart in commercial production. It also includes certain raw materials. The contracting officers will also authenticate the extension to subcontracts of preference ratings assigned to prime Army or Navy contracts, for items on the Priorities Critical List.

"The Army and Navy Munitions Board will similarly assign prefer-



ence ratings to prime contracts placed by certain other governmental agencies for equipment deemed essential to the defense program, upon application to the contracting officer or prime contractor. Such agencies now include the Maritime Commission, Coast and Geodetic Survey, Coast Guard and the National Advisory Committee for Aeronautics.

"The Priorities Division of the Office of Production Management in addition to administering requests for preference ratings on civilian requirements will be responsible for the determination of preference ratings on all items not on the Priorities Critical List and all allocations of raw materials which have been subjected to industry-wide priority control. All preference rating certificates and priority orders will be issued over the signature of the Director of Priorities, but the Army and Navy Munitions Board will be supplied with preference rating certificates signed in blank to be issued to the Army

and Navy contracting officers for authentication by them in accordance with the general policy outlined above. Carbon copies of the completed certificate will be returned to the Priorities Division, for supervision, and to the Army and Navy Munitions Board.

"The administration of priorities by the Priorities Division is organized in five sections, each under a group chairman, namely: (1) minerals and metals; (2) chemicals; (3) commercial aircraft; (4) tools and equipment; (5) general products.

"Each of the five groups of the division is advised by one or more priority committee; made up, typically, of the group chairman of the section and representatives of the Army, the Navy, the producing industry, the industrial users and labor. Representatives of the Divisions of Production and Purchases will act as committee experts and contact points with those divisions. Advisers on price, consumer and

agricultural matters also will be available to the committees.

# Procedure in Making Application for Priority Certificates

"Prime Army or Navy Contracts.

—Ratings will be assigned by the Army or Navy contracting officers with respect to direct Army and Navy procurement. If a priority rating has not been obtained at any time by a government supplier and he believes that a rating is necessary, he may request that a certificate be issued by the contracting officer or inspector with whom he is in contact.

"If the prime contractor wishes that this rating be extended to his subcontractors, he should ask the Army or Navy inspectors, procurement district officials, or contracting officers, to complete a Preference Rating Certificate. The Army or Navy official will only authenticate such an extension if the item purchased is covered by the 'Priorities Critical List.'

"All Other Domestic Contracts and Orders.—Before making application for a priority rating on items not on the Priorities Critical List, every effort should be made to arrange for delivery of materials and equipment on the required dates through the use of commercial channels. Readjusting schedules, making full use of machinery, subcontracting, substitute materials and processes are also urged. If these means fail, applications should be made to the Director of Priorities on the prescribed form. These forms may be obtained from all Federal Reserve Bank offices and from Army and Navy field procurement and inspection officers or from the Director of Priorities, New Social Security Building, Washington.

"The application form requires that the applicant substantiate his claim for preference rating to avoid harm to other parts of the defense program. When the application is received by the Office of the Director of Priorities, it will be administered by the group chairman in charge of the particular material and checked with the Purchase and Production Divisions for alternative solutions. The decision of all group chairmen will be routed through the central office of the Priorities Division to insure coordination. Preference Rating Certificates will be issued by the Director of Priorities.



Twin plants, with complete modern facilities in each, enable us to fill orders for one spring or millions...meet delivery schedules...maintain peak quality. For years we've been licking spring problems of many industries, and that experience is yours for the asking. Operations are laboratory controlled from raw material to finished product, backed up by modern equipment and master craftsmen who grew up in spring making. Large stocks of spring materials on hand, too... varied sizes and kinds.

Yes, you'll get your springs on time... and long-life performance that means so much today. Send your inquiries or orders to either plant.

SPRINGS - WIRE FORMS - SMALL STAMPINGS

BARNES-GIBSON-RAYMOND

DETROIT PLANT

DETROIT, MICHIGAN TWO PLANTS ANN ARBOR, MICHIGAN

"Contracts of Foreign Governments.—Preference ratings will be assigned to the contracts for the production of material for certain foreign governments, by the Army and Navy Munitions Board. Contractors desiring help or information in this area should contact the foreign government official who signed the order concerned.

"General.—The Priorities Division will seek to avoid the imposition of priorities wherever such imposition would needlessly conflict with civil and private activity, and, in so far as possible, action will be withheld until an actual shortage in connection with defense requirements is imminent.

"When it is necessary to delay delivery on any order as a result of a preference rating, the customer affected should be notified as soon as the delay becomes apparent.

"Only a duly signed and authenticated preference rating certificate should be considered binding upon a manufacturer, but contracting officers should encourage manufacturers to indicate to their subcontractors and suppliers what rating would be extended to the work if formal preference rating certificates were requested. This will enable the sub-contractors to plan their work in such a way as to ease the readjustment which might come if and when a preference rating certificate is issued.

"All departments and bureaus of the federal government have agreed to the request of the President that if delivery of a government contract carrying a penalty clause is delayed in execution by reason of the application of priorities in favor of another contract, extension in time of such time of delivery may be authorized upon request of the contractor to the contracting officer.

"Requests for further information should be directed to:

Director of Priorities Officer of Production Management New Social Security Building Washington, D. C."

#### Priorities Critical List

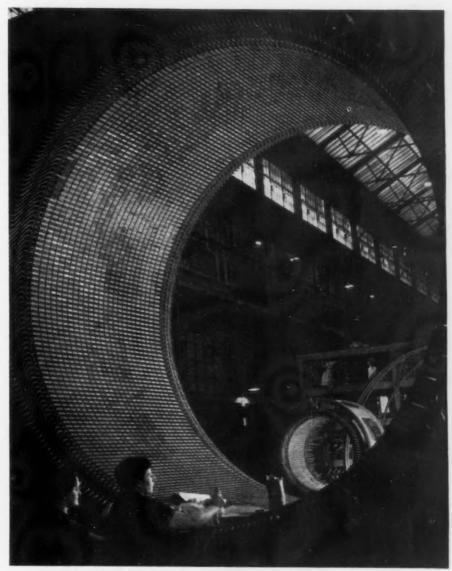
(Items for which preference ratings are authorized in metal-working lines.)

--A--

Aiming circles.

Aircraft: all types including lighter-than-air, complete.

Altimeters: all types.



BIG BLOW: Skilled hand work was required in building a giant motor which will create wind speeds of 400 mph. to test airplane models in the new aeronautical wind tunnel at the Army's Wright Field, Dayton, Ohio. Here a craftsman at the Westinghouse East Pittsburgh, Pa., works fits some of the windings in the stator of the motor.

Aluminum and aluminum alloys: pig or fabricated.

Ambulances: service specifica-

Ambulance boats.

Anti-aircraft equipment.

Ammunition (small arm and large caliber): all types.

Angledozers.

Auger: earth (power).

Armor plate.

Aircraft detection equipment.

—B—

Barges.

Barometers.

Batteries: radio; ship; fire control.

Bearings: roller and ball.

Belt: ammunition link; cartridge.

Binoculars; monoculars; spy glasses; field glasses; spotting glasses.

Boats: aircraft rescue; picket; crane; assault; ambulance; Eagle; landing; motor torpedo; utility (QMC and AC); sub-chaser; target (armored); motor launch; radio control; lighters; D.B. (distribution box).

Boilers: power plant; heating. Bombs.

Box: ammunition.

Brass: pig and fabricated.

Bridges: foot (all types); steel (portable); pontoon (all types).

Bronze: pig or fabricated.

Battery chargers portable. Bulldozers.

—C—

Cables, electric: under water; fire control; lead sheath or lead and armor; degaussing; including assemblies.

Calibration sets, bomb sight; optical elements for.

Calipers, micrometer.

Cameras: aeronautical; gun; triangulation, motion picture and still.

Camera control: gun.

Canisters: service; diaphragm; optical.

Castings: steel, heavy; brass (over 150 lb.); aluminum.

Catapult: aircraft.

Charger: gun (hydraulic).

Chromium alloy steel.

Cipher devices and machines.

Combat vehicles.

Containers: galvanized; portable refrigerated.

Compressors (air): power driven. Computers: intermediate and major calibers; time and distance; line of position. Condensers: steam.

Cone assembly 6-in. metrogon lens.

Control equipment for electric motors, automatic.

Cooking outfit: mess and field.

Corrector: percentage; fire control.

Cranes.

Cutters: wire, and carriers (special service types).

Cylinders: chemical (portable); compressed gas or air.

—D—

Demustardizing equipment: chemical warfare.

Diamond point tools.

Dies: forging; diamond.

Distribution boxes.

Drydocks: floating.

-E-

Electric generators, motors and motor generators, dynameters: all except N.E.M.A. standard types, meeting A.I.E.E. specifications and rules.

Energizers: aircraft electric.

Extinguishers (fire): foam, carbon dioxide; tetra-chloride.

-F-

Finders: radio direction; height; depression position; vertical view; range.

Fire control instruments and equipment.

Flashlights (service types).

Flash ranging set. Flying equipment.

Forgings: brass; steel; aluminum.

Frequency meter set, radio.

Fuzes and primers. Fuze-setters.

Floodlighting equipment.

—G—

Gastight doors and frames.

Generating units; service types.

Generators: electric, except N.E.M.A. standard types of A.I.E.E. specifications.

Glasses: field, spotting; binoculars; spy; monoculars.

Grenades.

Gages, inspection.

Goggles (service types).

Grader, road; self-propelled.

Guns: all types and calibers (including carriages and mounts) Limbers, and caissons.

-H-

Hammers, power driven.

Head and chest set: communication.

Height finders.

Helmets (service types).

Hoist: ammunition.

Hoists power or hand.

Howitzers: all types and calibers, with limbers, caissons, carriages and mounts.

-I-

Instruments: battery commander; electro-diagnostic; observation; optical (all types-complete); stereoscopic training; surgical; surveying; aximuth and aximuth mils; self-synchronous (engine).

Interphone equipment: (aircraft; vehicular).

—J—

Jigs and fixtures.

-K-

Kits: first aid; repair (C.W.); toilet.

-L-

Laboratory: field.

Lamp equipment: signal.

Lighters and barges.

Lighting equipment: electric (portable), service types.

Locators, sound: anti-aircraft (CAC).

Lockers: steel; foot.

Locomotives: diesel; gasoline; electric.

\_M\_

Machine, blasting.

Machine guns: all types and calibers with mounts, sights, and tripods.

Machine and metal working tools.

Machinery: forging; powerdriven, for casting, cutting, grinding, hoisting, melting, metal pressing, welding, refrigerating.

Magazines: small arms ammunition.

Marker beacon receiving equip-

Masks: gas; oxygen.

Meggers, insulation testing.

Mess outfits: field; barracks; ship.

Meters: electric; drift.



There is a Time when Politeness Ceases to be a Virtue NOW IS THAT TIME... You are a Sentry in America's First Line of Defense. The **Production** Line... Don't hesitate to challenge Strangers... Spies don't wear uniforms. Demand Credentials... IT'S YOUR SAFETY that's at stake.

### You are a PRODUCTION SOLDIER... America's First Line of Defense is HERE

PITTSBURGH STEEL companies this week had hung posters like this (by Cy Hungerford, Pittsburgh cartoonist) to warn their workmen of sabotage, of the need for more production. Meter set: frequency (seacoast).
Mines: anti-tank; drifting or anchored.

Mine equipment: submarine.

Mine planters and yawls.

Magnesium and alloys: pig or fabricated.

Monel metal.

Mortars: all types and calibers with carriages, mounts.

Motors for pontoons.

Motorcycles: solo or side car (service types).

#### -N-

Nickel: pig or fabricated: Nickel: alloy steel.

#### --0-

Octant: bubble type.

Optical elements and instruments.

#### -P-

Pontoon equipment.

Projectors: signal (ground).

Pumping sets, all types.

Purification unit: water.

#### ---R--

Radio-apparatus (sending and receiving): all types.

Radio direction finders.

Range: field, complete with equipment.

Rangefinders.

Ranging equipment: sound.

Reels, firing.

Remote control equipment, for guns and searchlights.

Reproduction equipment: map (all types).

Repurification plant, helium (portable).

Rifles: magazines; machine; automatic; semi-automatic.

#### --S--

Scabbards: small-arms.

Scale: prediction.

Ship plates.

Searchlights.

Searchlight control instruments. Ships: all types—complete.

Small arms: all types and cali-

Smoke screen apparatus.

Sound equipment: underwater.

Sound locators: anti-aircraft.

Steel, electric furnace; bullet; armorplate; special treatment; tungsten; nickel; chrome; vanadium.

Stereoscopes: all types.

Stereoscopic testers.

Stoves: tent.

Submarine mine cable: steel.



Photo by Harris-Ewing

BOMB SERVICE TRUCKS like this are being used at U. S. Army Corps bases. These trucks, rigged with derrick and windlass, handle bombs weighing 600 to 1200 lb.

Submarine safety and escape devices.

Switchboards, power complete assembly.

#### —T—

Tags: identification.

Tanks: cartridge; combat, all types and models; powder.

Telephones: all special service types; radio, and equipment.

Telegraph sets (service specifications).

Testing outfits, boiler water.

Theodolites.

Thermometers, air-standard, mercurial.

Time interval apparatus.

Tin.

Tools, precision; hand.

Torpedoes.

Tractors: military.

Trailers: 2, 4 and 6 wheel, assorted; bomb.

Trainer: binaural; stereoscopic; instrument flying and landing (ground).

Transformers, electric.

Trucks: motor (all special service types).

Tungsten, ferro tungsten and tungsten ore.

Tungsten alloy steel.

#### --V-

Vanadium and vanadium alloys. Vehicles (service types).

#### \_w\_

Wire: service types (see conductor); field (S.C.).

--Z-

Zinc.

#### FBI Warns of Sabotage Fires In Defense Plants

Chicago

• • • To prevent sabotage by fire in defense factories, careful surveys of fire-fighting equipment and constant surveillance by industrialists are needed, according to E. P. Coffey, chief of the Federal Bureau of Investigation's technical laboratory. Special plans should be prepared for defense plants, with alternate plans in case fire-fighting equipment is destroyed, since deliberately set fires can be made to appear accidental. FBI experts have already made fire surveys in about 1200 of the 1800 plants working on defense work.

### Government Awards

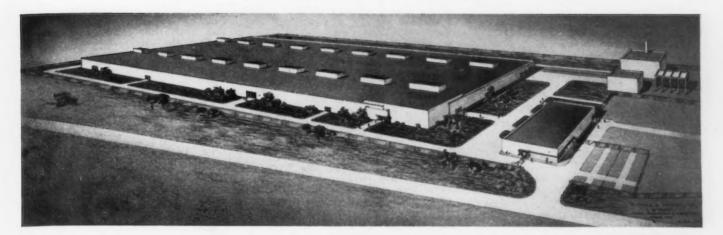
Government awards, during the week ended March 15, 1941, as listed by the Public Contracts Division, Department of Labor, follow:

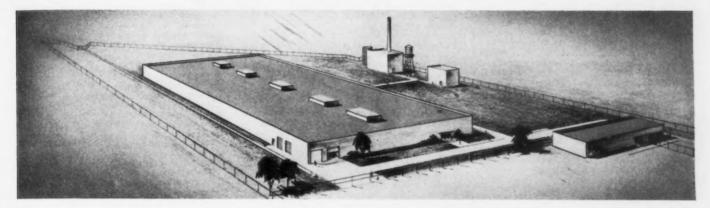
Air Associates Inc. Bondiy N	437,820	delp Pittsh
Air Associates, Inc., Bendix, N. J.; nuts  American Chain & Cable Co., Inc.,	\$18,638	Poole
York, Pa.; shackles	49,840	Reeve
ington; ropes; jackstays	238.300	Ohi
Chas. W. Azias, Oper. Recr. Pat- terson Tool & Supply Co., Day-		Repul
ton, Ohio; screw-driver, cabinet. Babcock & Wilcox Co., San Fran-	11,370	John ton
cisco; parts for boilers Baldt Anchor Chain & Forge Corp.,	103,573	Rustl
Chester, Pa.; chains and fittings Bethlehem Steel Co., Bethlehem,	71,740	Scott
Pa.; steelstructural steel	15,341 18,499	Seatt
Bilt Rite Mfg. Co., Grand Rapids, Mich.; water-closet seats	29,700	Sunra
S. Blickman, Inc., Weehawken, N. J.; straddle stands	35,800	Super
Bolt & Nut Div., Republic Steel Corp., Cleveland; nuts	198 418	Theri
Emil Brown & Co., Los Angeles:	128,418	gel Timk
steam tables; cabinets, etc	17,803	ton
California Wire Cloth Corp., Oak- land, Cal.; cloth, steel and brass		ste
Carnegie Illinois Steel Corp.,	10,769	Oh
Philadelphia; steel	35,689	Unio
Ore.; steel sleeves	12,015	Unite
York; canister parts	47,260	Virgi
Crane Co., Washington; high pres-	01.070	P. V
sure valves	21,879 12,094	bui
gate valves	33,476	Wall
composition valves	44,540	Sp
New York; steel	35,748	Walv
Philadelphia; vises	19,650	Whee
steel chests  Edwards Mfg. Co., Cincinnati;	54.821	Your
Fairmount Tool & Forging Co.,	12,300	
Cleveland; motor maintenance		Non
equipment	23,956	Alun
Federal Screw Works, Detroit; plate screws and pins	10,717	ing
Stanley G. Flagg & Co., Inc., Phila- delphia; crosses, elbows, etc	25,204	Ame
Stanley G. Flagg & Co., Inc., Philadelphia; tube fittings	84,233	Chas Ne
Garlock Packing Co., Philadelphia; metallic packing	10,692	Elgin
Graybar Elec. Co., Knoxville, Tenn.; steel conduit	11,994	Elgin
Hamilton Metal Products Co., Hamilton, Ohio; tool kits	28,750	Fyr- ex
Louis Hanssen's Sons, Davenport, Ia.; miscl. hardware	28,746	Inter
Kilgore Mfg. Co., Westerville, Ohio; hand grenade fuzes	267,376	Inter
H. A. Kuljian & Co., Philadelphia;		Inte
The McKay Co., Pittsburgh: chains	162,901	Ye
and fittings	279,859	C. C
Francisco; nails	14,282	Mag
bus, Ohio; fabricated steel Midvale Co., Philadelphia; forg-	11,344	Niag Fa
ings, for cold-working equipment Noland Co., Inc., Washington;	22,456	Post
conduit pipe, steel	Indefinite	Tite
Norwalk Lock Co., New York;	51,967	N.
bodies, plunger, fuze Oliver Iron & Steel Corp., Phila-	30,454	Oth
delphia; nuts	32,956	Adv
aircraft fittings	10,299	Air J.
The state of the s		

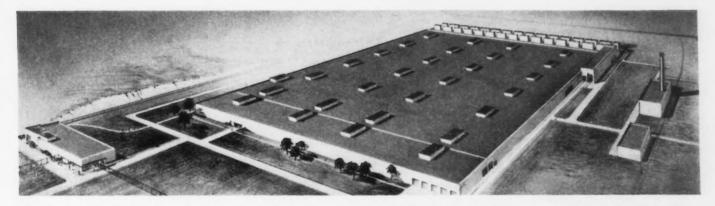
ended March 15, 1941, as listed Labor, follow:	by the
delphia; portable steel bents  Pittsburgh Screw & Bolt Corp.,	17,969
Pittsburgh; anchor bolts Poole & McGonigle, Portland, Ore.;	126,295
structural steel	17,250
Ohio; buckets; cans	12,616
pipe	18,991
ton, N. J.; wire rope	17,050
Rustless Iron & Steel Corp., Balti- more; steel bars	10,144
Scott Valve Mfg. Co., Washington:	17,005
Seattle Hardware Co., Seattle; chain hoists	40,499
Sunray Stove Co., Delaware, Ohio; gas ranges	231,000
Superior Metal Products Co., St. Paul; practice bombs	54,360
Thermador Elec. Mfg. Co., Los Angeles; practice bombs	119,700
Timken Roller Bearing Co., Canton, Ohio; steel tubing	12,720
Union Metal Mfg. Co., Canton,	12,390
Ohio; practice bombs Union Steel Chest Corp., Le Roy.	57,350
N. Y.; steel chests	76,367
Brooklyn; iron picket fence Virginia Mach. & Well Co., Inc.,	21,657
Richmond; composition valves  P. Wall Mfg. Supply Co., Pitts-	16,522
burgh; practice bombs	286,960
Spring Corp., Bristol, Conn.; springs	10,218
Walworth Co., New York; compo- sition valves	11,186
Wheeling Corrugating Co., Wheeling, W. Va.; corrugated cans	44,855
Youngstown Sheet & Tube Co., Youngstown, Ohio; sheet steel	17,309
Nonferrous Metals & Alloys\$2	,215,501
Aluminum Co. of America, Washington; inget aluminum	\$159,462 11,535
American Brass Co., Waterbury, Conn.; copper alloy sheets	25,542
Chase Brass & Copper Co., Inc., New York; brass tubing	26.048
Elgin National Watch Co., Elgin, Ill.; stop watches	93,620
Elgin National Watch Co., Elgin, Ill.; watches	54,529
Fyr-Fyter Co., Dayton, Ohio; fire extinguishers	12,492
International Nickel Co., Inc., New York; nickel, copper, alloy	41,714
International Nickel Co., Inc., New York; nickel-copper alloy	22,494
International Nickel Co., Inc., New	22,474
York; nickel-copper, alloy sheets, etc.	1,473,089
C. O. Jelliff Mfg. Co., Southport, Conn.; copper wire cloth	21,070
Magna Mfg. Co., Inc., New York; magnesium	224,623
Niagara Searchlight Co., Niagara Falls, N. Y.; flashlights	39,014
Postal Telegraph Sales Corp., New York; clocks	/Indefinite
Titeflex Metal Hose Co., Newark, N. J.; flexible tubing	10,263
Other Machinery\$	8,602,114
Advance Pressure Castings, Inc., Brooklyn; booster cups	\$10,925
Air Associates, Inc., Bendix, N. J.; testing equipment	22,050

Aircraft Accessories Corp., Sieben-	
thaler Div., Kansas City; test	
equipment	117,845
American Chain & Cable Co., Inc.,	
Wright Mfg. Div., York, Pa.;	
electric hoists	14,313
Anchor Post Fence Co., Baltimore;	19 000
Auto Car Co., Ardmore, Pa.; trac-	13,990
tor-trucks	1,256,340
Automatic Pencil Sharpener Co.,	X12001040
Automatic Pencil Sharpener Co., Div. of Spengler-Loomis Mfg.	
Co., Chicago: sharpeners	12,618
Axelson Mfg. Co., Los Angeles; lathes, engine	
lathes, engine	10,692
Bay City Shovels, Inc., Bay City,	
Mich.; power shovels	15,617
Bay City Shovels, Inc., Bay City,	11 795
Mich.; crane  Bendix Westinghouse Automotive	11,725
Air Brake Co., Pittsburgh; emer-	
gency relay valve	43,355
Berkley Machine Works & Foundry	
Co., Inc., Norfolk, Va.; tubes	57,752
Binks Mfg. Co., Chicago; spray	
type engine cleaner	11,952
G. H. Bishop Co., Chicago; laun-	
dry equipment	16.332
G. S. Blakeslee & Co., Cicero, III.; machs. for cleaning threads	16,560
Buda Co., Harvey, Ill.; parts for	10,000
diesel engines	21,567
earth augers	89,896
Bullard Co., Bridgeport, Conn.;	
turret lathes	39,498
Canister Co., Phillipsburg, N. J.;	
loading machine	34,000
Chandler-Evans Corp., South Meri-	00.000
den, Conn.; fuel pumps	36,030
Cincinnati Milling Machine & Cin-	
cinnati Grinders, Inc., Cincin- nati; milling machines	62,055
Clark Tructractor Div., Clark	921000
Equip. Co., Jersey City; truc-	
tractors	16,160
Cleveland Twist Drill Co., Cleve-	
land; drills	11,302
Arthur Colton Co., Detroit; tablet	
machines	120,617
Consolidated Machine Tool Co.,	119 695
Rochester, N. Y.; planer Continental Motors Corp., Muske-	113,685
gon, Mich.; parts for tanks	46,592
County Supply Co., Plainfield, N.	
J.; drills	14,512
Cummins Engine Co., Washington;	
diesel generator	14,074
Cummings Machine Works, Bos-	
ton; leveling fixtures	17,893
Cuno Engineering Corp., New	19 440
York; parts for diesel engs Dayton Type, Inc., Dayton, Ohio;	13,440
drilling machine	10,550
Dodge Mfg. Corp., Mishawaka,	20,000
Ind.; dolly assys	53,154
Dravo Corp., Neville Island Branch,	
Pittsburgh: gantry cranes	132,000
Duro Co., Dayton, Ohio; mount	
assys	48,725
Eclipse Aviation Div., Bendix Avia.	60 610
Corp., Bendix, N. J.; starter	93,840
Eclipse Mach. Div., Bendix Avia. Corp., Elmira, N. Y.; shot	38,400
Elliott Machine Co., Baltimore;	00,100
dredge pumps	24,020
Ellis Drier Co., Chicago; extrac-	
tors	10,650
Federal Electric Co., Inc., Chicago;	
electric horns	18,532
Federal Electric Co., Chicago; gas	23/2 284
alarms	86,614
Gisholt Machine Co., Madison,	62,658
Wis.; turret lathes	02,050
Good Roads Mach. Corp., Ken- nett Square, Pa.; rock crusher.	26,532
Graybar Electric Co., Inc., Nor-	60,00
folk, Va.; ventilating sets	16,997
Henrici Laundry Machinery Co.,	
Boston; washing machines	12,880
Boston; washing machines High Pressure Pump Corp., Wilkes-	12,880
High Pressure Pump Corp., Wilkes- Barre, Pa.; power equipment	12,886 59,891
High Pressure Pump Corp., Wilkes- Barre, Pa.; power equipment Hobart Mfg. Co., Troy, Ohio;	
High Pressure Pump Corp., Wilkes- Barre, Pa.; power equipment Hobart Mfg. Co., Troy, Ohio; kitchen and cake machs	
High Pressure Pump Corp., Wilkes- Barre, Pa.; power equipment Hobart Mfg. Co., Troy, Ohio;	59,89









THREE NEW DEFENSE plants are being built by Studebaker Corp. One photo (at top) shows how Studebaker's Chicago plant (600,000 sq. ft.) for manufacture of precision parts for Wright airplane engines, will look. The company's Fort Wayne, Ind., plant (center), occupying 240,000 sq. ft., will manufacture plane engine gears while its main manufacturing and assembly plant (900,000 sq. ft.) for making Wright engines will be (below) at South Bend, Ind.

Hydraulic Press Mfg. Co., Mount Gilead, Ohio; molding presses Independent Pneumatic Tool Co., Chicago; rockdrill, digger; wood boring mach. Industrial Brownhoist Corp Bay City, Mich.; locomotive cranes. Ingersoll-Rand Co., Washington; centrifugal boiler Jacobson & Co., Inc., New York; stands Jones & Lamson Machine Co., Springfie'd, Vt.; lathes R. W. Kaltenbach Corp., Bedford, Ohio; gantry cranes King-Seeley Corp., Ann Arbor,	24,070 51,367 120,095 10,855 16,952 148,677 236,500	Le Roi Co., Milwaukee; parts for air compressors  McDonald Machinery Co., St. Louis; power presses  McKiernan Terry Corp., Dover, N. J.; staking machines  McKiernan-Terry Corp., Dover, N. J.; staking machines  Martin Machinery Corp., New York; gathering machine  Anthony M. Meyerstein, Inc., Brooklyn; cranes  Montgomery Elevator Co., Moline, Ill.; freight elevators  Morse Diving Equip. Co., Inc., Boston; pumps, diving appar  Nash-Kelvinator Corp., Detroit; re-	51,367 11,140 128,846 10,869 21,500 319,280 17,082 17,657	New England Auto Products Corp., Pottstown, Pa.; universal joints Northern Pump Co., Minneapolis; pumps Olympic Foundry Co., Seattle; welding slabs Orton Crane & Shovel Co., Chicago; hammerhead cranes Parker Appliance Co., Cleveland; tube benders Pittsburgh Steel Foundry Corp., Glassport, Pa.; rack castings Prosperity Co., Inc., Syracuse, N. Y.; laundry equipment Read Machinery Co., Inc., York, Pa.; preheater Rheem Mfg. Co., Los Angeles;	38,210 39,884 33,960 238,824 31,590 67,500 369,676
Ohio; gantry cranes	236,500	Boston; pumps, diving appar	17,657	Pa.; preheater	74,227
Mich.; air vapor eliminators Landley Co., Inc., New York;	101,660	frigerators National Cash Register Co., Day-	1,311,250	furnaces	140,062
davits	20,768	ton, Ohio; practice shell	32,051	furnaces	13.25

St. Joe Machines, Inc., St. Joseph,		International Minerals & Metals		American Steel & Wire Co. of N.	
Mich.; washers and presses	91,597	Corp., New York; zinc, slab		J., Boston; steel	34,675
Sipp Eastwood Corp., Paterson, N.		(spelter)	7,610	Ampeo Twist Drill Co., Jackson,	
J.; drilling machine	24,375	Jenkins Brothers, Bridgeport.	010.00	Mich.; drills	1,016
Standard Steel Works, Div. Bald-		Conn.; valves, angle, flooding	212,180	Apex Tool & Cutter Co., Shelton.	* ***
win Locomotive Works, Philadel-	TO TO 4	Walter Kidde & Co., Inc., New	101 050	Conn.; bits and blades, steel	2.496
phia; propeller shafts	59,594	York; cylinders, oxygen	424,653	cutters	6,004
Star Iron & Steel Co., Tacoma,	222 7.15	D Co., Elmhurst, N. Y.; accel-		Arrow Tool & Reamer Co., De-	1 705
Wash.; cranes	238,500	erometers, aircraft	234,000	Atlan America Co. New House	1,787
F. J. Stokes Machine Co., Phila-		Lidgerwood Mfg. Co., Elizabeth,	204,000	Atlas-Ansonia Co., New Haven.	50 407
delphia; pelleting presses	196,950	N. J.: winches, diesel, double		Conn.; metal parts for fuze Automatic Die & Products Co.,	59,400
Swenson Evaporator Co., Harvey,		drum, gypsy, etc	37.548	Cleveland; fixtures	3,287
Ill.; evaporator	15,500	Midvale Co., Washington; forg-	01,040	Baird Machine Co., Stratford,	0,201
Timken-Detroit Axle Co., Detroit:		ings, steel	109,560	Conn.; tumblers and equipment	3,381
axle assys.; hub assys	63,513	James M. Motley & Co., Inc., New	200,000	Baldwin Locomotive Works, Bald-	0,001
Harold E. Trent Co., Philadelphia;		York; machines, threading, bolt.		win-Southwark Div., Philadel-	
reducing kettles	17.815	double head, motor driven	5,624	phia; pumps	1,068
Tungsten Elec. Corp., Union City,		machine, bolt heading and forg-		Barber-Colman Co., Machine &	45.00
N. J.; carbide blanks	38,250	ing	13,100	Small Tool Div., Rockford, Ill.;	
U. S. Hoffman Machinery Corp.,		National Cylinder Gas Co., Chi-		form cutters	1.116
New York; washer tumblers	87,877	cago; cylinders, acetylene	7.044	reamers	2,919
laundry equipment	488,944	Norris Stamping & Mfg. Co., Los		Barker Tool, Die & Gauge Co., De-	
Victor Equipment Co., San Fran-		Angeles; containers, cartridge,		troit; gages	1,120
cisco; portable welding kit	12,225	aluminum	1,336,580	Bay State Abrasive Products Co.,	
Vinco Corp., Detroit; gages	11,748	Pittsburgh Steel Co., Pittsburgh :		Camden, N. J.; grinding wheels	1.450
Vulcan Copper & Supply Co., Cin-		tubing, steel, alloy	126,656	Bendix Aviation Corp., Pioneer In-	
cinnati; recovery and rectifica-	18 000	Pollack Mfg. Co., Arlington, N. J.;		strument Div., Bendix, N. J.;	
Western Coop Works Scottle	15,800	containers, cartridge, aluminum.	210,140	lamps, electric	1,64
Western Gear Works, Seattle;	44 400	Reynolds Metals Co., Louisville,		starters for light tanks	93,840
winches	44,460	Ky.; pipe, aluminum alloy	6,613	tools	27,68
C. H. Wheeler Mfg. Co., Philadel- phia: condenser and auxiliaries.	99 550	John A. Roebling's Sons Co., Tren-		Bendix Aviation Corp., Scintilla	
Wiedemann Machine Co., Philadel-	23,750	ton, N. J.; jackstays, pendants		Magneto Div., Sidney, N. Y.;	
phia; gages	12,783	and rope	115,723	parts for light tanks	3,63
E. J. Willis Co., New York; bilge	12,100	Sandy Hill Iron & Brass Works,		Bendix Westinghouse Automotive	
pumps	24,500	New York; winches, elec. dr	390,510	Air Brake Co., Pittsburgh, Pa.;	40.07
Wisconsin Axle Div., The Timken-	40 T 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Seattle Chain & Mfg. Co., Seattle:	20.074	valves	42,35
Detroit Axle Co., Oshkosh, Wis.;	-	chains and fittings	29,974	Bethlehem Steel Co., Bethlehem,	05.00
parts for tanks	48,277	Thomas Somerville Co., Washing-		Pa.; artillery materiel	25,000
Wolf Co., Chambersburg, Pa.:	,	ton; pipe, steel, seamless	10,218	G. S. Blakesless & Co., Cicero,	19 91
cartridge assys	272,779	Smith Booth Usher Co., Los An-		Ill.; washing machines E. W. Bliss Co., Brooklyn; presses,	12.31
Wright Machine Co., Worcester,		geles; miller and shaper, motor-	£ 100	vertical	9,75
Mass.; adapters and plugs	11,771	driven	5.100	Braeburn Alby Steel Corp., Brae-	3,19
H. G. W. Young Co., Boston;		Sperry Gyroscope Co., Inc., Brook-	204 222	burn, Pa.; steel	1,27
slicing machines	34,758	lyn; equipment, gyro compass	204.277	Bridgeport Brass Co., Bridgeport.	
		Standard Pressed Steel Co., Jen-		Conn.; artillery materiel	49.50
Navy Dent. Bureau of Supp	lies and	kintown, Pa.; conveyors, engine	19 593	artillery ammunition	4,31
Navy Dept., Bureau of Supp	lies and	parts	12,523		4.31
Navy Dept., Bureau of Supp Accounts:	lies and	Steuart Motor Co., Washington:		artillery ammunition	4,31
Accounts: Allegheny Ludlum Steel Corp.,	lies and	Steuart Motor Co., Washington: trucks, motor	12,523 8,272	artillery ammunition Brown-Brockmeyer Co., Inc., Day- ton, Ohio; moters and starting switches	1,02
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corro-	lies and	parts Steuart Motor Co., Washington: trucks, motor S. G. Taylor Chain Co., Hammond.	8,272	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Provi-	1,02
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets	\$16,401	parts Steuart Motor Co., Washington; trucks, motor S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings		artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders	1,02 5,26
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets		parts  Steuart Motor Co., Washington: trucks, motor  S. G. Taylor Chain Co., Hammond. Ind.; chains and fittings United Aircraft Corp., Hamilton	8,272	artillery ammunition  Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches  Brown & Sharpe Mfg. Co., Providence; grinders mills	1,02 5,26 2,80
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets American Brass Co., Waterbury, Conn.; tubing, copper-nickel-	\$16,401	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings  United Aircraft Corp., Hamilton Standard Propellers Div., E.	8,272	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps	1,02 5,26
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy		parts Steuart Motor Co., Washington; trucks, motor S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades.	8,272 11,753	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; motors and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums,	1,02 5,26 2,80 1,20
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy.  sheets, tubes, condenser, copper-	\$16,401 138,845	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings  United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller	8,272	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies	1,02 5,26 2,80
Accounts:  Allegheny Ludium Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy	\$16,401	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings  United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chi-	8,272 11,733 23,268	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., To-	1,02 5,26 2,80 1,20 3,21
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy American-La France-Foamite Corp.,	\$16,401 138,845 238,632	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings  United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending.	8,272 11,753	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings	1,02 5,26 2,80 1,20
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy sheets, tubes, condenser, copper- nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen	\$16,401 138,845	parts Steuart Motor Co., Washington; trucks, motor S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery	8,272 11,733 23,268	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings	1,02 5,26 2,80 1,20 3,21 1,53
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy sheets, tubes, condenser, copper- nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen American Smelting & Refining Co.,	\$16,401 138,845 238,632 157,730	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings  United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main	8,272 11,733 23,268	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg, Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel	1,02 5,26 2,80 1,20 3,21
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen American Smelting & Refining Co., New York; zinc, slab (spelter).	\$16,401 138,845 238,632	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings  United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending.  Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine	8,272 11,753 23,268 5,270	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel. Carborundum Co., Philadelphia,	1,02 5,26 2,80 1,20 3,21 1,53
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy sheets, tubes, condenser, copper- nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen  American Smelting & Refining Co., New York; zinc, slab (spelter).  American Zinc Sales Co., Inc., New	\$16,401 138,845 238,632 157,730 7,795	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending  Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts	8,272 11,733 23,268	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding	1,02 5,26 2,80 1,20 3,21 1,53
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy sheets, tubes, condenser, copper- nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen  American Smelting & Refining Co., New York; zinc, slab (spelter)  American Zinc Sales Co., Inc., New York; zinc, slab (spelter)	\$16,401 138,845 238,632 157,730	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts  Yale & Towne Mfg. Co., Philadel-	8,272 11,753 23,268 5,270	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings	1,02 5,26 2,80 1,20 3,21 1,53 1,26
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy American-La France-Foamite Corp., Elmira; cylinders, oxygen American Smelting & Refining Co., New York; zinc, slab (spelter) American Zinc Sales Co., Inc., New York; zinc, slab (spelter) Babcock & Wilcox Co., Alliance,	\$16,401 138,845 238,632 157,730 7,795 10,910	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings  United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts  Yale & Towne Mfg. Co., Philadel- phia Division, Philadelphia;	8,272 11,753 23,268 5,270 71,595	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg, Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome	1,02 5,26 2,80 1,20 3,21 1,53 1,26 1,26
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy sheets, tubes, condenser, copper- nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen  American Smelting & Refining Co., New York; zinc, slab (spelter)  American Zinc Sales Co., Inc., New York; zinc, slab (spelter) Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment	\$16,401 138,845 238,632 157,730 7,795	parts Steuart Motor Co., Washington; trucks, motor S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts Yale & Towne Mfg. Co., Philadel- phia Division, Philadelphia; trucks, electric	8,272 11,753 23,268 5,270	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar	1,02 5,26 2,80 1,20 3,21 1,53 1,26
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy sheets, tubes, condenser, copper- nickel-alloy American-La France-Foamite Corp., Elmira; cylinders, oxygen American Smelting & Refining Co., New York; zinc, slab (spelter) American Zinc Sales Co., Inc., New York; zinc, slab (spelter) Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment Baker - Raulang Co., Cleveland;	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aireraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts  Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Auto-	8,272 11,753 23,268 5,270 71,595	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.;	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy sheets, tubes, condenser, copper- nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen  American Smelting & Refining Co., New York; zinc, slab (spelter) American Zinc Sales Co., Inc., New York; zinc, slab (spelter) Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment Baker - Raulang Co., Cleveland; trucks, electric, industrial	\$16,401 138,845 238,632 157,730 7,795 10,910	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts  Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Automatic Transportation Co. Divi-	8,272 11,753 23,268 5,270 71,595 73,004	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg, Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel	1,02 5,26 2,80 1,20 3,21 1,53 1,26 1,26
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy sheets, tubes, condenser, copper- nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen  American Smelting & Refining Co., New York; zinc, slab (spelter)  American Zinc Sales Co., Inc., New York; zinc, slab (spelter)  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment  Baker - Raulang Co., Cleveland; trucks, electric, industrial  Baldt Anchor, Chain & Forge	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aireraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts  Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Auto-	8,272 11,753 23,268 5,270 71,595	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc.,	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy sheets, tubes, condenser, copper- nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen  American Smelting & Refining Co., New York; zinc, slab (spelter)  American Zinc Sales Co., Inc., New York; zinc, slab (spelter)  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment  Baker - Raulang Co., Cleveland; trucks, electric, industrial  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, an-	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings  United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts  Yale & Towne Mfg. Co., Philadel- phia Division, Philadelphia; trucks, electric  Yale & Towne Mfg. Co., Auto- matic Transportation Co. Divi- sion, Chicago; trucks, electric.	8,272 11,753 23,268 5,270 71,595 73,004	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery ma-	1,02 5,26 2,80 1,20 3,21 1,53 1,26 1,26 10,83 11,30 60,11
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy sheets, tubes, condenser, copper- nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen  American Smelting & Refining Co., New York; zinc, slab (spelter)  American Zinc Sales Co., Inc., New York; zinc, slab (spelter)  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment  Baker - Raulang Co., Cleveland; trucks, electric, industrial  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, an- chor; links, detachable; shots	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000 73,668	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts  Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Automatic Transportation Co. Divi-	8,272 11,753 23,268 5,270 71,595 73,004	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy sheets, tubes, condenser, copper- nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen  American Smelting & Refining Co., New York; zinc, slab (spelter)  American Zinc Sales Co., Inc., New York; zinc, slab (spelter)  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment  Baker - Raulang Co., Cleveland; trucks, electric, industrial  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, an- chor; links, detachable; shots and tool sets, etc.	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000 73,668 435,568	parts Steuart Motor Co., Washington; trucks, motor S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Dept., Ordnance:	8,272 11,753 23,268 5,270 71,595 73,004 5,200	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel	1,02 5,26 2,80 1,20 3,21 1,53 1,26 1,26 10,83 11,30 60,11 4,36 51,34
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy sheets, tubes, condenser, copper- nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen  American Smelting & Refining Co., New York; zinc, slab (spelter)  American Zinc Sales Co., Inc., New York; zinc, slab (spelter)  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment Baker - Raulang Co., Cleveland; trucks, electric, industrial  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, an- chor; links, detachable; shots and tool sets, etc. chains and fittings	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000 73,668	parts Steuart Motor Co., Washington; trucks, motor S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts Yale & Towne Mfg. Co., Philadel- phia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Auto- matic Transportation Co. Divi- sion, Chicago; trucks, electric War Dept., Ordnance: Robert Abel, Inc., Boston; hoists.	8,272 11,753 23,268 5,270 71,595 73,004	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, coppernickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Inc., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial.  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000 73,668 435,568 30,383	parts  Steuart Motor Co., Washington: trucks, motor  S. G. Taylor Chain Co., Hammond. Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades. propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts  Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric.  Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Dept., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc.,	8.272 11.753 23.268 5.270 71.595 73.004 5.200	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Brass & Copper Co., Inc.,	1,02 5,26 2,80 1,20 3,21 1,53 1,26 1,26 10,83 11,30 60,11 4,36 51,34
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen  American Smelting & Refining Co., New York; zinc, slab (spelter)  American Zinc Sales Co., Inc., New York; zinc, slab (spelter)  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment  Baker - Raulang Co., Cleveland; trucks, electric, industrial  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc. chains and fittings  Carroll Chain Co., Columbus, Ohio; chains and fittings	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000 73,668 435,568	parts Steuart Motor Co., Washington; trucks, motor S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aireraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Dept., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition.	8,272 11,753 23,268 5,270 71,595 73,004 5,200	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers	1,02 5,26 2,80 1,20 3,21 1,53 1,26 1,26 10,83 11,30 60,11 4,36 51,34
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, coppernickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Inc., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial.  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000 73,668 435,568 30,383	parts  Steuart Motor Co., Washington: trucks, motor  S. G. Taylor Chain Co., Hammond. Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades. propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts  Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric.  Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Dept., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc.,	8.272 11.753 23.268 5.270 71.595 73.004 5.200	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg, Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel. Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Brass & Copper Co., Inc., Chase Metal Works Plant, Wa-	1,02 5,26 2,80 1,20 3,21 1,53 1,26 1,26 10,83 11,30 60,11 4,36 51,33 13,87
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickelalloy sheets, tubes, condenser, copper-nickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  American Zinc Sales Co., Inc., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial.  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000 73,668 435,568 30,383 40,690	parts Steuart Motor Co., Washington; trucks, motor S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts Yale & Towne Mfg. Co., Philadel- phia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Auto- matic Transportation Co. Divi- sion, Chicago; trucks, electric.  War Dept., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New	8,272 11,753 23,268 5,270 71,595 73,004 5,200 86,172 8,880	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies. Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel. Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Metal Works Plant, Waterville, Conn.; brass rod	1,02 5,26 2,80 1,20 3,21 1,53 1,26 1,26 10,83 11,30 60,11 4,36 51,33 13,87
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickelalloy sheets, tubes, condenser, copper-nickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial.  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc. chains and fittings  Carroll Chain Co., Columbus, Ohio; chains and fittings  Colvinex Corp., New York; preheater, engine.	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000 73,668 435,568 30,383 40,690	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts  Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric  Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Dept., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor Allegheny-Ludlum Steel Corp., Wa-	8,272 11,753 23,268 5,270 71,595 73,004 5,200 86,172 8,880 2,816 29,250	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland Automatic Machine Co.,	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,36 51,33 13,87 18,58
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, coppernickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial.  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000 73,668 435,568 30,383 40,690 17,100	parts  Steuart Motor Co., Washington: trucks, motor  S. G. Taylor Chain Co., Hammond. Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades. propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts  Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric  Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Dept., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor	8.272 11.753 23.268 5.270 71.595 73.004 5.200 86.172 8.880 2.816	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg, Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Brass & Copper Co., Inc., Chase Brass & Copper Co., Inc., Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable.	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,36 51,34 13,87
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickelalloy sheets, tubes, condenser, copper-nickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial sladt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc. chains and fittings  Carroll Chain Co., Columbus, Ohio; chains and fittings  Colvinex Corp., New York; preheater, engine  Crucible Steel Co. of America, New York; steel, bar, round.  Euclid Crane & Hoist Co., Euclid, Ohio; hoists, electric.	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000 73,668 435,568 30,383 40,690 17,100	parts Steuart Motor Co., Washington: trucks, motor S. G. Taylor Chain Co., Hammond. Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades. propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine driven and spare parts Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia trucks, electric Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Depf., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor Allegheny-Ludlum Steel Corp., Watervliet, N. Y.; rods, steel Alton Iron Works, Inc., Pitts-	8.272 11.753 23.268 5.270 71,595 73,004 5,200 86,172 8,880 2,816 29,250 225,595	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Brass & Copper Co., Inc., Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland; tools lathes	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,36 51,33 13,87 18,58
Accounts:  Allegheny Ludium Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen  American Smelting & Refining Co., New York; zinc, slab (spelter)  American Zinc Sales Co., Inc., New York; zinc, slab (spelter)  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment  Baker - Raulang Co., Cleveland; trucks, electric, industrial  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc. chains and fittings  Carroll Chain Co., Columbus, Ohio; chains and fittings  Carroll Chain Co., Columbus, Ohio; chains and fittings  Colvinex Corp., New York; preheater, engine  Crucible Steel Co. of America, New York; steel, bar, round Euclid Crane & Hoist Co., Euclid, Ohio; hoists, electric.  Fairbanks, Morse & Co., Chicago;	\$16.401  138.845  238.632  157.730  7.795  10.910  2.550,000  73.668  435.568  30.383  40.690  17.100  26.312	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending.  Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, trubine driven and spare parts  Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric  Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Dept., Ordnance:  Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor  Allegheny-Ludlum Steel Corp., Watervliet, N. Y.; rods, steel  Alton Iron Works, Inc., Pitts-burgh; steel	8,272 11,753 23,268 5,270 71,595 73,004 5,200 86,172 8,880 2,816 29,250	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg, Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Brass & Copper Co., Inc., Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland Automatic Machine Co., Cleveland; tools lathes	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,36 51,34 13,87 18,58 1,21 1,01 71,53
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickelalloy sheets, tubes, condenser, copper-nickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  American Zinc Sales Co., Inc., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial.  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000 73,668 435,568 30,383 40,690 17,100 26,312 178,795	parts Steuart Motor Co., Washington; trucks, motor S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Depf., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor Allegheny-Ludlum Steel Corp., Watervliet, N. Y.; rods, steel Alton Iron Works, Inc., Pitts- burgh; steel Aluminum Co. of America, Wash-	8,272 11,753 23,268 5,270 71,595 73,004 5,200 86,172 8,880 2,816 29,250 225,595 1,526	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies. Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel. Carborundum Co., Philadelphia, Pa.; wheels, grinding. Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland; tools lathes Cleveland Container Co., Philadelphia; artillery ammunition.	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,36 51,33 13,87 18,58 1,21 1,01
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickelalloy sheets, tubes, condenser, copper-nickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Inc., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial.  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc.  chains and fittings.  Carroll Chain Co., Columbus, Ohio; chains and fittings.  Colvinex Corp., New York; preheater, engine  Crucible Steel Co. of America, New York; steel, bar, round.  Euclid Crane & Hoist Co., Euclid, Ohio; hoists, electric.  Fairbanks, Morse & Co., Chicago; drive, diesel engine and equipment.	\$16.401  138.845  238.632  157.730  7.795  10.910  2.550,000  73.668  435.568  30.383  40.690  17.100  26.312	parts Steuart Motor Co., Washington: trucks, motor S. G. Taylor Chain Co., Hammond. Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades. propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending. Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine driven and spare parts Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia trucks, electric Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Depf., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor Allegheny-Ludlum Steel Corp., Watervliet, N. Y.; rods, steel Alton Iron Works, Inc., Pitts- burgh; steel Aluminum Co. of America, Wash- ington; aluminum strip	8.272 11.753 23.268 5.270 71.595 73.004 5.200 86,172 8.880 2.816 29.250 225.595 1.526 2.148	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Brass & Copper Co., Inc., Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland Automatic Machine Co., Cleveland Container Co., Philadelphia; artillery ammunition Cleveland Twist Drill Co., Cleve-	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,36 51,34 13,87 18,58 1,21 1,01 71,55 80,11
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial.  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000 73,668 435,568 30,383 40,690 17,100 26,312 178,795	parts  Steuart Motor Co., Washington; trucks, motor  S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller  Wallace Supplies Mfg. Co., Chicago; machine, pipe bending.  Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, trubine driven and spare parts  Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric.  Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Dept., Ordnance:  Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor  Allegheny-Ludlum Steel Corp., Watervliet, N. Y.; rods, steel  Alton Iron Works, Inc., Pittsburgh; steel  Aluminum Co. of America, Washington; aluminum strip rod, aluminum strip	8.272 11.753 23.268 5.270 71.595 73.004 5.200 86,172 8,880 2,816 29,250 225,595 1,526 2,148 94,750	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg, Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Brass & Copper Co., Inc., Chase Brass & Copper Co., Inc., Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland Automatic Machine Co., Cleveland tools lathes Cleveland Container Co., Philadelphia; artillery ammunition Cleveland Twist Drill Co., Cleveland; drills	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,36 51,34 13,87 18,58 1,21 1,61 71,53
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  American Zinc Sales Co., Inc., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial.  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc., chains and fittings.  Carroll Chain Co., Columbus, Ohio; chains and fittings.  Colvinex Corp., New York; preheater, engine.  Crucible Steel Co. of America, New York; steel, bar, round.  Euclid Crane & Hoist Co., Euclid, Ohio; hoists, electric.  Fairbanks, Morse & Co., Chicago; drive, diesel engine and equipment.  Flexitallic Gasket Co., Camden, N.  J.; gaskets, pipe flange, metal-	\$16,401  138,845  238,632  157,730  7,795  10,910  2,550,000  73,668  435,568  30,383  40,690  17,190  26,312  178,795  8,894	parts Steuart Motor Co., Washington; trucks, motor S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending. Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts.  Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Dept., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor. Allegheny-Ludlum Steel Corp., Watervliet, N. Y.; rods, steel. Alton Iron Works, Inc., Pittsburgh; steel	8.272 11.753 23.268 5.270 71.595 73.004 5.200 86,172 8.880 2.816 29.250 225.595 1.526 2.148	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies. Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel. Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel. Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Brass & Copper Co., Inc., Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland Automatic Machine Co., Cleveland; tools lathes Cleveland Container Co., Philadelphia; artillery ammunition Cleveland Twist Drill Co., Cleveland; drills Colt's Patent Fire Arms Mfg. Co.,	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,36 51,33 13,87 18,58 1,21 1,01 71,53 80,11 3,01
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Inc., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial.  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc.  chains and fittings.  Carroll Chain Co., Columbus, Ohio; chains and fittings.  Colvinex Corp., New York; preheater, engine.  Crucible Steel Co. of America, New York; steel, bar, round.  Euclid Crane & Hoist Co., Euclid, Ohio; hoists, electric.  Fairbanks, Morse & Co., Chicago; drive, diesel engine and equipment.  Flexitallic Gasket Co., Camden, N.  J.; gaskets, pipe flange, metal-lic asbestos, spiral wound.	\$16,401 138,845 238,632 157,730 7,795 10,910 2,550,000 73,668 435,568 30,383 40,690 17,100 26,312 178,795	parts Steuart Motor Co., Washington; trucks, motor S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending. Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Depf., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor Allegheny-Ludlum Steel Corp., Watervliet, N. Y.; rods, steel Alton Iron Works, Inc., Pitts- burgh; steel Aluminum Co. of America, Washington; aluminum alloy ingots, aluminum alloy ingots, aluminum alloy American Brass Co., Kenosha.	8,272 11,753 23,268 5,270 71,595 73,004 5,200 86,172 8,880 2,816 29,250 225,595 1,526 2,148 94,750 6,924	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies. Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel. Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland Automatic Machine Co., Cleveland; tools lathes Cleveland Container Co., Philadelphia; artillery ammunition. Cleveland Twist Drill Co., Cleveland; drills Colt's Patent Fire Arms Mfg. Co., Hartford; small arms materiel.	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,36 51,33 13,87 18,58 1,21 1,01 71,53 80,11 3,01 2,648,61
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen American Smelting & Refining Co., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment Baker - Raulang Co., Cleveland; trucks, electric, industrial Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc chains and fittings Colvinex Corp., New York; preheater, engine Crucible Steel Co. of America, New York; steel, bar, round Euclid Crane & Hoist Co., Euclid, Ohio; hoists, electric Fairbanks, Morse & Co., Chicago; drive, diesel engine and equipment Flexitallic Gasket Co., Camden, N. J.; gaskets, pipe flange, metallic asbestos, spiral wound Gardner-Denver Co., Washington;	\$16.401  138,845  238,632  157,730  7,795  10,910  2,550,000  73,668  435,568  30,383  40,690  17,100  26,312  178,795  8,894  39,568	parts Steuart Motor Co., Washington: trucks, motor S. G. Taylor Chain Co., Hammond. Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades. propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending. Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts Yale & Towne Mfg. Co., Philadel- phia Division, Philadelphia; trucks, electric. Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Depf., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor Allegheny-Ludlum Steel Corp., Watervliet, N. Y.; rods, steel Aluminum Co. of America, Washington; aluminum strip rod, aluminum alloy ingots, aluminum alloy ingots, aluminum alloy American Brass Co., Kenosha, Wis.; brass rod	8.272 11.753 23.268 5.270 71.595 73.004 5.200 86,172 8,880 2,816 29,250 225,595 1,526 2,148 94,750	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Brass & Copper Co., Inc., Chase Brass & Copper Co., Inc., Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland Automatic Machine Co., Cleveland; troils cleveland Twist Drill Co., Cleveland; drills Colt's Patent Fire Arms Mfg. Co., Hartford; small arms materiel.	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,36 51,33 13,87 18,58 1,21 1,01 71,53 80,11 3,01
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy  American-La France-Foamite Corp., Elmira; cylinders, oxygen  American Smelting & Refining Co., New York; zinc, slab (spelter)  American Zinc Sales Co., Inc., New York; zinc, slab (spelter)  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment  Baker - Raulang Co., Cleveland; trucks, electric, industrial  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc. chains and fittings  Carroll Chain Co., Columbus, Ohio; chains and fittings  Colvinex Corp., New York; preheater, engine  Crucible Steel Co. of America, New York; steel, bar, round  Euclid Crane & Hoist Co., Euclid, Ohio; hoists, electric  Fairbanks, Morse & Co., Chicago; drive, diesel engine and equipment  Flexitallic Gasket Co., Camden, N.  J.; gaskets, pipe flange, metallic asbestos, spiral wound  Gardner-Denver Co., Washington; compressor, air	\$16,401  138,845  238,632  157,730  7,795  10,910  2,550,000  73,668  435,568  30,383  40,690  17,190  26,312  178,795  8,894	parts Steuart Motor Co., Washington: trucks, motor S. G. Taylor Chain Co., Hammond. Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts Yale & Towne Mfg. Co., Philadel- phia Division, Philadel- phia Trucks, electric Yale & Towne Mfg. Co., Auto- matic Transportation Co. Divi- sion, Chicago; trucks, electric.  War Dept., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor Allegheny-Ludlum Steel Corp., Wa- tervliet, N. Y.; rods, steel Aluminum Co. of America, Wash- ington; aluminum strip rod, aluminum alloy ingots, aluminum alloy american Brass Co., Kenosha, Wis.; brass rod American Emery Wheel Works,	8,272 11,753 23,268 5,270 71,595 73,004 5,200 86,172 8,880 2,816 29,250 225,595 1,526 2,148 94,750 6,924 3,842	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Brass & Copper Co., Inc., Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland Automatic Machine Co., Cleveland; tools lathes Cleveland Container Co., Philadelphia; artillery ammunition Cleveland Twist Drill Co., Cleveland; drills Colt's Patent Fire Arms Mfg. Co., Hartford; small arms materiel. artillery materiel Consolidated Machine Tool Corp.,	1,02 5,26 2,80 1,20 3,21 1,53 1,26 1,26 10,83 11,30 60,11 4,36 51,34 13,87 18,58 1,21 1,61 71,53 80,11 3,01 2,648,66 1,91
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  American Zinc Sales Co., Inc., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial.  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc	\$16.401  138,845  238,632  157,730  7,795  10,910  2,550,000  73,668  435,568  30,383  40,690  17,100  26,312  178,795  8,894  39,568	parts Steuart Motor Co., Washington; trucks, motor S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending. Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts. Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Dept., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor Allegheny-Ludlum Steel Corp., Watervliet, N. Y.; rods, steel Aluminum Co. of America, Washington; aluminum strip rod, aluminum alloy ingots, aluminum alloy american Brass Co., Kenosha, Wis.; brass rod American Emery Wheel Works, Providence; wheels	8,272 11,753 23,268 5,270 71,595 73,004 5,200 86,172 8,880 2,816 29,250 225,595 1,526 2,148 94,750 6,924	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland; tools lathes Cleveland Container Co., Philadelphia; artillery ammunition Cleveland Twist Drill Co., Cleveland; drills Colt's Patent Fire Arms Mfg. Co., Hartford; small arms materiel. artillery materiel Consolidated Machine Tool Corp., Rochester, N. Y.; planers	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,366 51,33 13,87 18,58 1,21 1,01 71,53 80,11 3,01 2,648,61 2,648,61
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial.  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc. chains and fittings.  Carroll Chain Co., Columbus, Ohio; chains and fittings.  Carcible Steel Co. of America, New York; steel, bar, round.  Euclid Crane & Hoist Co., Euclid, Ohio; hoists, electric.  Fairbanks, Morse & Co., Chicago; drive, diesel engine and equipment.  Flexitallic Gasket Co., Camden, N. J.; gaskets, pipe flange, metallic asbestos, spiral wound.  Gardner-Denver Co., Washington; compressor, air General Motors Corp., Cleveland, Diesel Engine Div., Cleveland	\$16.401  138.845  238.632  157.730  7.795  10.910  2.550,000  73.668  435.568  30.383  40.690  17.100  26.312  178.795  8.894  39.568  13,832	parts Steuart Motor Co., Washington: trucks, motor S. G. Taylor Chain Co., Hammond. Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending. Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine driven and spare parts Yale & Towne Mfg. Co., Philadel- phia Division, Philadelphia; trucks, electric. Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Depf., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor Allegheny-Ludlum Steel Corp., Watervliet, N. Y.; rods, steel Aluminum Co. of America, Washington; aluminum strip rod, aluminum alloy ingots, aluminum alloy American Brass Co., Kenosha, Wis.; brass rod American Emery Wheel Works, Providence; wheels American Monorail Co., Philadel-	8,272 11,753 23,268 5,270 71,595 73,004 5,200 86,172 8,880 2,816 29,250 225,595 1,526 2,148 94,750 6,924 3,842	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Brass & Copper Co., Inc., Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland Automatic Machine Co., Cleveland; tools lathes Cleveland Container Co., Philadelphia; artillery ammunition Cleveland Twist Drill Co., Cleveland; drills Colt's Patent Fire Arms Mfg. Co., Hartford; small arms materiel. artillery materiel Consolidated Machine Tool Corp.,	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,36 51,34 13,87 18,58 1,21 1,01 71,53 80,11 3,01 2,648,61 1,91
Accounts:  Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets.  American Brass Co., Waterbury, Conn.; tubing, copper-nickel-alloy sheets, tubes, condenser, copper-nickel-alloy.  American-La France-Foamite Corp., Elmira; cylinders, oxygen.  American Smelting & Refining Co., New York; zinc, slab (spelter).  American Zinc Sales Co., Inc., New York; zinc, slab (spelter).  Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment.  Baker - Raulang Co., Cleveland; trucks, electric, industrial.  Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, anchor; links, detachable; shots and tool sets, etc	\$16.401  138,845  238,632  157,730  7,795  10,910  2,550,000  73,668  435,568  30,383  40,690  17,100  26,312  178,795  8,894  39,568	parts Steuart Motor Co., Washington; trucks, motor S. G. Taylor Chain Co., Hammond, Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades, propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending. Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts. Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Dept., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor Allegheny-Ludlum Steel Corp., Watervliet, N. Y.; rods, steel Aluminum Co. of America, Washington; aluminum strip rod, aluminum alloy ingots, aluminum alloy american Brass Co., Kenosha, Wis.; brass rod American Emery Wheel Works, Providence; wheels	8,272 11,753 23,268 5,270 71,595 73,004 5,200 86,172 8,880 2,816 29,250 225,595 1,526 2,148 94,750 6,924 3,842 1,166	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg. Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland Automatic Machine Co., Cleveland; drills Colt's Patent Fire Arms Mfg. Co., Hartford; small arms materiel. artillery materiel consolidated Machine Tool Corp., Rochester, N. Y.; planers Continental Machines, Inc., Minne-	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,36 51,3,3 13,87 18,58 1,21 1,01 71,55 80,11 3,01 2,648,6 1,91 167,47
Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting, sheets. American Brass Co., Waterbury, Conn.; tubing, copper-nickel- alloy sheets, tubes, condenser, copper- nickel-alloy American-La France-Foamite Corp., Elmira; cylinders, oxygen American Smelting & Refining Co., New York; zinc, slab (spelter) American Zinc Sales Co., Inc., New York; zinc, slab (spelter) Babcock & Wilcox Co., Alliance, Ohio; ordnance equipment Baker - Raulang Co., Cleveland; trucks, electric, industrial Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chains, an- chor; links, detachable; shots and tool sets, etc. chains and fittings Carroll Chain Co., Columbus, Ohio; chains and fittings Colvinex Corp., New York; pre- heater, engine Crucible Steel Co. of America, New York; steel, bar, round Euclid Crane & Hoist Co., Euclid, Ohio; hoists, electric Fairbanks, Morse & Co., Chicago; drive, diesel engine and equip- ment Flexitallic Gasket Co., Camden, N. J.; gaskets, pipe flange, metal- lic asbestos, spiral wound Gardner-Denver Co., Washington; compressor, air General Motors Corp., Cleveland Diesel Engine Div., Cleveland engines, main, spares	\$16.401  138.845  238.632  157.730  7.795  10.910  2.550,000  73.668  435.568  30.383  40.690  17.100  26.312  178.795  8.894  39.568  13,832	parts Steuart Motor Co., Washington: trucks, motor S. G. Taylor Chain Co., Hammond. Ind.; chains and fittings United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford; assemblies, blades. propeller Wallace Supplies Mfg. Co., Chicago; machine, pipe bending Worthington Pump & Machinery Corp., Washington; pumps, main condensate, turbine, turbine driven and spare parts Yale & Towne Mfg. Co., Philadel- phia Division, Philadelphia; trucks, electric Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago; trucks, electric.  War Dept., Ordnance: Robert Abel, Inc., Boston; hoists. Advance Pressure Castings, Inc., Brooklyn; artillery ammunition. Aerial Machine & Tool Corp., New York; tubing, seamless steel units, trigger motor Allegheny-Ludlum Steel Corp., Watervliet, N. Y.; rods, steel Alton Iron Works, Inc., Pitts- burgh; steel Aluminum Co. of America, Washington; aluminum strip rod, aluminum alloy american Brass Co., Kenosha, Wis.; brass rod American Emery Wheel Works, Providence; wheels American Moncrail Co., Philadel- phia; tractors	8,272 11,753 23,268 5,270 71,595 73,004 5,200 86,172 8,880 2,816 29,250 225,595 1,526 2,148 94,750 6,924 3,842 1,166	artillery ammunition Brown-Brockmeyer Co., Inc., Dayton, Ohio; moters and starting switches Brown & Sharpe Mfg, Co., Providence; grinders mills pumps Budd Wheel Co., Detroit; drums, brake and assemblies Bunting Brass & Bronze Co., Toledo, Ohio; bushings Cape Ann Tool Co., Pigeon Cove, Mass.; forgings, drop, steel Carborundum Co., Philadelphia, Pa.; wheels, grinding Carnegie-Illinois Steel Corp., Chicago; steel, chrome steel bar Carpenter Steel Co., Reading, Pa.; rods, steel Chase Brass & Copper Co., Inc., Waterbury, Conn.; artillery materiel brass rod retainers Chase Brass & Copper Co., Inc., Chase Brass & Copper Co., Inc., Chase Metal Works Plant, Waterville, Conn.; brass rod Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists, portable. Cleveland Automatic Machine Co., Cleveland Twist Drill Co., Cleveland; drills Colt's Patent Fire Arms Mfg, Co., Hartford; small arms materiel artillery materiel Consolidated Machine Tool Corp., Rochester, N. Y.; planers Continental Machines, Inc., Minneapolis; machines	1,02 5,26 2,80 1,20 3,21 1,53 1,26 10,83 11,30 60,11 4,36 51,34 13,87 18,58 1,21 1,01 71,53 80,11 3,01 2,648,61 1,91 167,47

#### GOVERNMENT AWARDS

Arthur A. Crafts Co., Inc., Bos-		International Engineering Works,		Michigan Tool Co., Detroit; cutters	2,201
ton; gages	1,250	Inc., Framingham, Mass.; artil-		Midvale Co., Philadelphia; forgings	22,456
Crucible Steel Co. of America, New York: forgings, tube, alloy		International Harvester Co., Daven-	9,750	Modern Tool & Die Corp., Phila-	1.170
steel	8.645 9.294	port, Iowa; spare parts for trac- tors	15.860	Mohawk Machine & Tool Cc., New York; gages	1,424
Culbert Pipe & Fittings Co., Read-	2.104	Interstate Mechanical Laboratories, New York; dies	8,640	Morse Twist Drill & Machine Co.,	1,124
ing, Pa.; valves, gate	35,700	J. F. Johnson & Co., Philadelphia;	7,632	New Bedford, Mass.; steel Niles-Bement-Pond Co., Pratt &	1,620
Dana Tool-D Nast Mach. Co.,	1.000	Jehnson-Claffin Corp., Marlboro, Mass.; gages	1,045	Whitney Div., West Hartford: cutting tools	4,830
Philadelphia; reamers Denman & Davis, North Bergen,	1,090	Jones & Laughlin Steel Corp.,	1,040	taps lathes	1,069 1,187
N. J.; steel bars	1.272	Pittsburgh; steel	4.318	drill assemblies	6,280
Detroit Broach Co., Inc., Detroit; broaches	3,268	thumb, brass	19,500	Noble & Westbrook Mfg. Co., East Hartford; marking machines	13,260
Deveau Machine Tool Co., Charles-	1.050			Norton Co., Philadelphia; grinding	
town, Mass.; gages	1,250			Norton Ca., Worcester, Mass.;	1,266
town; artillery ammunition	7.189	1400000		wheels	1,776
Duplex Mfg. Corp., Sherman, N. Y.; steel chests	54,821	14% Of Defense Ord		Ohio Seamless Tube Co., Shelby, Ohio; seamless steel	3,720
Eastern Tool & Mfg. Co., Bloom-	1,969	Go To Pacific Co	ast	Otis Elevator Co., Buffalo; artil-	
field, N. J.; wires Electric Arc Cutting & Welding	1,300	• • • Defense orders awa		Parent Metal Products, Inc., Phila-	17,296
Co., Newark; welders, electric	1,095	in the three Pacific Coast st	ates	delphia; wire and steel	2,051
Elliott Co., Philadelphia; filter,	1,000	from July 1, 1940, to Feb		Pickands Mather & Co., Chicago; pig iron	1,347
water Emeis Electrical Service, Daven-	1.545	1941, totaled \$1,799,928,778 pared with \$12,377,053,247		Pipe Machinery Co., Cleveland;	1 055
port, Iowa; shafts, gears, etc	1,621	the entire country. Value		Porter, H. K., Inc., Pittsburgh;	1,855
Englewood Plumbing Supply Co., Inc., Chicago; ells, tees, steel		awards by various govern agencies to the three s		Pratt & Whitney Co., Hartford;	1.100
welding with beveled ends	4.100	during that period are:	tates	gages	3,760
Ex-Cell-O Corp., Continental Tool Works Div., Detroit; tools	5,431	California		Precision Mfg. Co., Philadelphia;	10,139
Federal Products Corp., Providence; gages	1.090	Army contracts\$576,75		Henry Prentiss & Co., Inc., New	
Federal Screw Works, Detroit;		Navy contracts 617,45 Maritime Commission. 4,76	4,833 6,000	York; punch press Proctor & Schwartz, Inc., Phila-	1,613
screws and pins	10,717 12,454		9,184 2,000	delphia; drying machines  Producto Machine Co., Bridgeport,	3,945
Charles Fisher Spring Co., Brook-	0.111	U. S. defense training. 2,04	4,088 6,929	Conn.; tools	11,332
lyn; small arms materiel Fox Munitions Corp., Philadelphia;	9,111		7,560	R. & M. Mfg. Co., Royal Oak, Mich.; gages	9,526
Fuller Brush Co., Hartford;	25,494	Total\$1,258,68	0,071	Reliable Tool Co., Irvington, N. J.;	4.372
brushes, commercial, steel chan-		Oregon		Republic Steel Corp., Chicago;	4,012
General Electric Co., Schenectady;	1,116		7,871 2,562	steel bar	21,505 19,369
units equipment for motor feed- ers	7,126	Maritime Commission. 4,78	7,000 8,241	Riverside Metal Co., Riverside, N.	
General Motors Corp., Harrison	1,120	Defense Plant Corp 1,00	0,000	J.; strip, nickel silver Robinson Mfg. Co., Muncy, Pa.;	3,892
Radiator Div., Lockport, N. Y.;	27,861		6,925	screening machines	17,745
Gilbert & Barker Mfg. Co., Spring-		Total\$36.29	2,599	Reading; cranes	1,495
field, Mass.; small arms materiel Gould-Mersereau Co., Inc., New	96,271	Washington Army contracts\$156,94	7 096	Rustless Iron & Steel Corp., Balti- more, Md.; steel	1,836
York; bolts, brass	10,600	Navy contracts 336,07	5,379	Jos. T. Ryerson & Sons, Inc., Chi-	
breakers and current transform-		USHA defense projects 2,3:	5,107 0,960	wm. Scrimgeour, Washington;	1,099
Greene-Wolf Co., Inc., Chester,	2.031		32,066 00,000	knives, ladles, skimmers, etc Seeley Tube & Box Co., Newark;	23,529
Pa.; pipe, steel welding	13,282	RFC defense projects. 1,57	5,570	artillery ammunition	84,410
Greenfield Tap & Die Corp., Greenfield, Mass.; gages	7,893	Total\$504,96 Entire U. S\$12,377,03		Seiberling Rubber Co., Barberton, Ohio; gaskets, for cartridge	
Mass.; steel, structural	17,995			storage cases Sellers, William & Co., Inc., Phila-	7,878
Hanson-Whitney Machine Co., Hart-		,		delphia; grinders	1,792
ford; cutters	1.211	Kobe, Inc., Huntington Park, Cal.;		Service Caster & Trunk Co., Som- erville, Mass.; lift truck	1,191
Louis Hanssen's Sons, Davenport.		gages	7,825	Sheffield Gage Corp., Dayton, Ohio;	
Iowa; hardware	30,498	H. R. Krueger & Co., Detroit; ma- chine, drilling	9,037	Sherman Engineering Co., Phila-	8,386
steel	2,112	machines, broaching	8,100	delphia; vacuum pump units	6,600
delphia; fire control equipment.	9,305	K. O. Lee & Son Co., Aberdeen, S. D.; grinders	2,289	W. E. Shipley Machinery Co., Philadelphia; grinders	7,905
Hess & Barker. Philadelphia; countershaft assemblies	1,050	Lewis-Shepard Sales Corp., Water-		Snap-On Tools Corp., Kenosha, Wis.; compressor, wrench	4,219
Hill Acme Co., Acme Machinery		town, Mass.; boxes, steel	1,902 1,008	Sperry Gyroscope Co., Inc., Brook-	
John W. Hobbs Corp., Springfield,	2,340	Lincoln Park Tool & Gage Co.,	17 000	lyn; fire control equipment Standard Pressed Steel Co., Jen-	1,250
Ill.; meters	5,420	Lincoln Park, Mich.; gages Lincoln Park Tool & Gage Co.,	17,326	kintown, Pa.; tables	4,432
drilling and reaming machines.	3,105	Lincoln Park, Ill.; gages	12,562	Standard Tool & Die Corp., West Allis, Wis.; gages	1,860
Hollup Corp., Chicago; electrodes.	5,709	Lindley Electric Supply Co., Phila- delphia; wire	4,158	Stedfast & Roulston, Inc., Boston; automatic machines	11,170
welding	1,489	Lovejoy Tool Co., Inc., Springfield,	9 9 9 9	Stewart-Warner Corp., Chicago:	
dale, Pa.; springs	1,318	Vt.; inserts, right and left hand Machinery Builders, Inc., Long	2,332	units, fusegages	601,180 7,828
Illinois Gage Co., Chicago; gages. Industrial Engineering Equip. Co.,	3,751	Island City, N. Y.; machines Mattatuck Mfg. Co., Waterbury.	3,124	F. J. Stokes Machine Co., Phila-	
Davenport, Iowa; equipment	1,725	Conn.; artillery ammunition	5,250	Swind Machinery Co., Philadel-	3,650
Rockford, Ill.; cutters	1.848	McKenna Metals Co., Latrobe, Pa.;	1,240	phia; hack saws	2,611 3,678
			2.60	meadvine, ra., gages	0.010

Thurston Mfg. Co., Providence;		Motor 7
tools, cutting	2,425 1.217	Ira S Brook
Timken-Detroit Axle Co., Detroit;	*****	power
sin Axle Div., Oshkosh, Wis.;	10 077	A. L.
parts for tanks	48,277	York ; Caterpil
plates, shield	5,094	III.; 1
Timken Roller Bearing So., Steel & Tube Div., Canton, Ohio;		Chicago troit;
steel	12,390	Clevelar
Tools & Gages, Inc., Cleveland;		land;
True Alloys, Inc., Detroit; cast-	2,920	Clevelar
ings, hoist	1,008	Consolid
Truscon Steel Co., Cleveland;	0.114	Philac
boxes and platforms Tungsten Electric Corp., Union	2.114	etc
City, N. J.: tools	2,050	Crescent
Union Steel Chest Corp., LeRoy, N. Y.; steel chests	76,367	Co., T
Union Twist Drill Co., Athol,	10,501	Y.; p
Mass.; tools	7,282	Curtiss-
drills United Shoe Machinery Corp., Bev-	1,260	plane maint
erly, Mass.; gears	2,203	engine
Universal-Cyclops Steel Corp., Bridgeville, Pa.; rods, steel	996 149	fusela Doehler
Vinco Corp., Detroit; gages	226,143 13,268	New
Vulcan Mold & Iron Co., Latrobe,		and c
Pa.; chill molds, cast iron Waterbury Button Co., Waterbury,	2,127	Equitab Orlea
Conn.; artillery ammunition	9,018	tug
Waterbury Farrel Foundry & Ma-		Famco
chine Co., Waterbury, Conn.;	7,200	Fargo 1
tools	1,701	С. Н. 6
Weaver Mfg. Co., Springfield, Ill.; artillery materiel	4,200	ton, (
Weber Machine Corp., Rochester,	4,200	chopp
N. Y.; gages	2,232	Gulf Co
J. H. Weil & Co., Philadelphia;	1.531	hile,
Weldon Tool Co., Cleveland; tools.	9,159	Mich.
Western Cartridge Co., East Alton, Ill.; small arms ammunition	9 608 465	wheel Indian
	3,608,465	Mass.
Western Cartridge Co., Winchester Repeating Arms Co. Div., New		Ingerso
Haven, Conn.; small arms materiel	161.745	N. ) parts
White Motor Co., Cleveland; auto-	101,120	parts
motive equipment	3,629	Joslyn
Wiedemann Machine Works, Phila- delphia; gages	12,747	Kenned Ohio;
Willamette Hyster Co. of Oregon,		King-Se
Portland, Ore.; parts for Winch for Caterpillar tractor	1,292	Mich.
Yale & Towne Mfg. Co., Philadel-	1,202	E. A.
phia; steel trolleys	1,299	presse
War Dept., Other Agencies:		Lansing
		York Lanston
Albert & Davidson Pipe Corp., Brooklyn; drive pipes	\$7,719	Phila
Aluminum Co. of America, Wash-	4.1	M. D.
ington; aluminum	283,970 5,480	Lionel
American Chain & Cable Co., Inc.,	0,400	doors
American Cable Div., Wilkes-		Machin
Barre, Pa.; cable	50,936	ton,
Elizabeth, N. J.; trucks	220,332	Mall T
American Steel & Wire Co., Cleve-	54555	P. R. I
land; cable	54,757	James
Products Div., South Bend, Ind.;		gages
gun charging cylinders Bendix Aviation Corp., Eclipse	304,175	Meli-Bl
Aviation Div., Bendix, N. J.; in-		stein, Munitie
verters	31,150	keeps
wheel and brake assemblies Bishop Wire & Cable Corp., New	106,906	(incl
York; cable	43,650	Neale cable
Blackhawk Mfg. Co., Milwaukee; hydraulic ram	656	wire
H. O. Boehme, Inc., New York;	900	North
miscellaneous equipment	777	Ingle parts
Boeing Aircraft Co., Seattle; am- munition boxes and gun mounts	202,800	Okonite
Buda Co., Harvey, Ill.; earth	202,000	Wire
augers	89,869	Parkell York
Motor Tug Corinthian, Inc., c/o Ira S. Bushey & Sons Co.,		Paving
Brooklyn; 82-ft. steel, diesel-		Wash
powered tug, "Corinthian"	140,000	chine

SOVERNMENT AWA	RDS
Motor Tug Carpathian, Inc., c/o Ira S. Bushey & Sons Co., Brooklyn; 82-ft. steel, diesel- powered tug "Carpathian"	
	140,600
A. L. Cahn & Sons, Inc., New York; tray service trucks	5,775
Ill.; graders	153,150
York: tray service trucks  Caterpillar Tractor Co., Peoria,  Ill.; graders  Chicago Pneumatic Tool Co., Detroit; riveters  Cleveland Trencher Co., Cleveland trench diggers	107,220
	5,475
Cleveland Drill Co., Cleveland; drills	542
Consolidated Steel Warehouse Co., Philadelphia; rails, angle bars,	
etc. steel Crescent Insulated Wire & Cable	1,109 3,009
Co., Trenton, N. J.; cable	14,750
Y.; pliers and wrenches	73,911
Curtiss-Wright Corp., Curtiss Aero-	
plane Div., Buffalo; airplane maintenance parts	353.687 108.695
fuselage parts	454,256
New York: steel dressers, tables	FO 200
and chairs	52,650
Orleans; 82-ft. all-welded steel	296,000
Famco Machine Co., Racine. Wis.: presses, arbor	12,122
Fargo Motor Co., Detroit; chassis C. H. Gosiger Machinery Co., Day-	710
ton, Ohio; presses, arbor Griswold Mfg. Co., Erie; machines,	3,360
chopper, meat and food 500 Gulf Coast Well & Pump Co., Mo-	560
bile, Ala.; deep well pump Hayes Industries, Inc., Jackson,	1.050
Mich.; brake assemblies wheel and brake assemblies	26,928 336,804
Indian Motorcycle, Springfield, Mass.; motorcycles, solo	86,422
Ingersoll-Rand Co., Painted Post, N. Y.; air compressor spare	00,122
parts	1,460
parts  pneumatic riveting hammers  Joslyn Co., New York; augers	25,436 $3,300$
Co., Van Wert, Ohio; kits, tool	66,600
King-Seeley Corp., Ann Arbor, Mich.; air vapor eliminators and valves	
valves E. A. Kinsey Co., Cincinnati;	101,660
E. A. Kinsey Co., Cincinnati; presses, arbor	1,785
York; trailers	22,970
Philadelphia; whirler, vertical	1,405
M. D. Larkin Co., Dayton, Ohio; presses, arbor	7,402
doors Chicago; metal	3,893
Machinery & Specialties, Inc., Day- ton, Ohio; saws, hack, power	24,140
mall Tool Co., Chicago; drills	1,353 39,375
P. R. Mallory & Co., Inc., Indian- apolis; shackle releases	108,090
James P. Marsh Corp., Chicago;	2,740
gages, 2000	
stein, Wis.; trailers	27,920
keepsie, N. Y.; aircraft cannon (including machinery)	7,255,000
Neale Mfg. Co., Topeka, Kan.; cable lashing machines and	
wire lashing coils	1,042
Inglewood, Cal.; maintenance parts for airplanes	945,348
Okonite Co., Hazard Insulated Wire Works Div., Chicago; cable	28,710
Parkell Engineering Co., New York; motor generator sets	
Paving Supply & Equip. Co., Washington; rail driving ma-	A 4.477 A
chines	8,977

reck Stow & Wilcox Co., South-	
ington, Conn.; sheet metal ma- chinery	137,584
Presto Gas Mfg. Co., Chicago:	201,001
Presto Gas Mfg. Co., Chicago; parts for ranges	38,020
Racine Tool & Machine Co., Ra-	
cine, Wis.; saws, hack, power	28,842
Rolins Co., New York; bars	1,338
Rogers Bros. Corp., Albion, Pa.;	F F05
trailers Service Caster & Truck Co., Al-	5,525
bion, Mich.; trailer trucks	16,701
Service Tool & Engineering Co.,	20,102
Dayton, Ohio; instrument test-	
ing sets	168,990
Shepard Niles Crane & Hoist Corp.,	
Philadelphia; jib cranes	107,492
Southern Equipment Co., St. Louis, Mo.: tray service trucks.	48,235
Sparks-Winghington Co., Jackson,	20,200
Mich.; hoist assemblies	297,000
Spriesch Tool & Mfg. Co., Inc.,	
Buffalo; bomb shackle assys	136,530
Superior Sleeprite Corp., Chicago;	50.010
hospital beds	79,918
Taylor Machine Co., Cleveland: hoist assemblies	219,300
Trailco Mfg. & Sales, Hummells	M. A. S. S. C. C.
Wharf, Pa.; trailers, 2-wheel	
van	12,432
United Aircraft Corp., Pratt &	
Whitney Aircraft Division, East	
Hartford, Conn.; maintenance parts	131,439
United Aircraft Products, Inc.,	
Dayton, Ohio; regulator assem-	
blies oil temperature	64,194
U. S. Electrical Tool Co., Cincin-	19 500
nati; drills	13,500
Utica, N. Y.; pliers	6,890
Variety Aircraft Corp., Dayton. Ohio; pelorus assembly	
Ohio; pelorus assembly	68,425
Vultee Aircraft, Inc., Nashville, Tenn.; airplanes	0 505 000
Watson Automotive, Washington:	3,735,890
semi-trailers	216,133
Weaver Mfg. Co., Springfield, Ill.;	
hoiete	41,694
Edward W. Weiler, New York:	0.010
pipe bend	3,248
S. Weinstein Supply Co., New York; wrenches	886
Westinghouse Electric & Mfg. Co.,	0.70
Washington; electric refrigera-	
tors	29,226
lightning arresters	7.245
K. R. Wilson, New York; presses,	15,128
arbor F. C. Williams, Inc., Dearborn, Mich.; heating units	10,140
Mich.; heating units	59,098
Wright Aeronautical Corp., Pater-	
son, N. J.; maintenance parts	100 100
Yale & Towne Mfg. Co., Philadel-	402,125
phia: tractors and platform	
trucks	21,262
Yeomans Bros. Co., Chicago;	
Yeomans Bros. Co., Chicago; pumping units	4.982
Zahn Equipment & Supply Co.,	631
Columbus, Ohio; presses, arbor.	631

### Trade Notes

The Upson Walton Co. will move its Belleville, N. J., wire rope manufacturing operations to Cleveland next year, it is understood here. On land recently purchased there the company will erect new factory buildings to make possible expanded operations. Additional machinery is being purchased for the company's forge and machine shops here as well as for wire rope manufacture.

Marr-Galbreath Machinery Co., 55 Water Street, Pittsburgh, has discontinued its business as a corporation. Its warehouse stock will be sold at auction April 22. J. C. Marr will trade under his own name while M. D. Galbreath will trade as Galbreath Machinery Co., Empire Building, Pittsburgh.

### 6 Defense Contract Managers Appointed

Washington

• • • The following have been named district managers of field offices of the OPM's defense contract service:

For Cleveland—Herman H. Lind, president of the American Institute of Bolt, Nut and Rivet Manufacturers and former general manager of the National Machine Tool Builders Association.

For Philadelphia—Frederick W. Hankins, vice-president in charge of motive power for the Pennsylvania Railroad.

For Detroit—Warren H. Clarke, consulting engineer, formerly with Hyatt Roller Bearing Division, General Motors Corp.

For Atlanta—W. C. Cram, Jr., consulting engineer, formerly with the engineering department, Georgia Power Co.

For Kansas City—R. W. Webb, former vice-president, Witte Engine Works, Kansas City, and plant manager for Sears, Roebuck & Co.

For Dallas, Texas—A. J. Langford, former manager and district supervisor of the Ford Motor Co.

The defense contract service acquaints manufacturers with defense requirements of the Army and Navy, advises on engineering and financial problems, and brings together prime contractors and potential subcontractors with idle equipment.

#### Allegheny Ludlum May Again Expand Capacity

Pittsburgh

• • • Further increases in the volume of defense orders being placed with Allegheny Ludlum Steel Corp. indicate the probable necessity of further plant expansions in addition to those now under way. Allegheny Ludlum, according to W. F. Detwiler, chairman and H. G. Batcheller, president, has signified to the government the company's willingness to construct, with federal aid, such additional facilities as it may be in a position to operate efficiently.

Sales in 1940 totaled \$54,702,998, compared with \$37,332,141 in 1939. The company's total income of

\$54,779,332 during 1940 was distributed as follows: Salaries of officers, 1 per cent; all other wage and salary payments, 28.2 per cent; raw materials, fuel and power supplies, etc., 49.8 per cent; selling and administrative expense including salaries, 4.2 per cent; taxes, 6.19 per cent; depreciation and depletion, 2.5 per cent; other, 0.6 per cent; and profit, 6.8 per cent.

Taxes in 1940 reached \$2,773,429, a jump of 350 per cent from the federal and state income taxes and federal excess profit taxes of 1939 which amounted to \$616,386. Net income for 1940 amounted to \$3,722,107 or \$2.78 a share on the common stock after preferred payments, compared with \$2,093,518 or \$1.49 a share on the common in 1939.

#### Keep Arms Producing Facilities, Wesson Urges

Chicago

• • • "Don't scrap our arms producing facilities after this emergency has passed," Maj. Gen. Charles M. Wesson, chief of ordnance, United States Army, warned at a joint meeting here of the Army Ordnance Association, the Illinois Manufacturers' Association and the Illinois Manufacturers' Costs Association. The Ordnance chief said that present ordnance and plant construction programs were based on equipping an army of 2,000,000, and that much of today's job would have been eliminated if we had held on to the arms productive capacity built during the last war.

### Sterling Engine Plant Expands Buffalo

• • • Work has begun on the \$500,000 addition to the Sterling Engine Co. plant at 1270 Niagara Street, Buffalo, according to Addison F. Vars, president. The new building, with 75,000 sq. ft. of floor space, will be ready by September and will be used for assembling and testing of Sterling Admiral engines, now required by the U.S. Navy and British Admiralty for powering small, speedy craft such as motor torpedo boats. Robert E. Williams & Sons Co., Inc., of Buffalo, are the general contractors.

#### Electro Metallurgical To Build Oregon Plant

• • • Property near Portland, Ore., has been acquired for the site of a new manufacturing plant of Electro Metallurgical Co., a unit of Union Carbide & Carbon Corp. Construction will start soon. This plant will be designed to manufacture calcium carbide and ferrosilicon. In addition, as demand develops and as local supplies of chrome and manganese ores become available in commercial quantities, manganese- and chrome-bearing alloys can also be produced.

#### Rohr Aircraft Corp. Gets Navy Contract

Los Angeles

• • • The Navy Department has entered into a contract with the Rohr Aircraft Corp., of Chula Vista, Cal., for construction, acquisition and installation of additional plant facilities at the plant of that corporation at Chula Vista at an estimated cost of approximately \$567,000. This expansion includes the construction of approximately 130,000 sq. ft. of new manufacturing area and the acquisition and installation of machinery and equipment for the manufacture of aircraft engine nacelle assemblies.

#### Nash-Kelvinator Makes Trailers For Army

Racine, Wis.

• • • Army trailers are now in production at Nash-Kelvinator's plant here. The factory has been used but little since the company consolidated its motor car facilities in Kenosha, Wis. According to the general manager, two eight hour shifts will soon be at work on the \$3,000,000 trailer order.

### Toledo Steel Products Enlarges

• • • • The Toledo Steel Products Co., controlled by Thompson Products, Inc., Cleveland, will build a \$100,000 addition to its Toledo plant, Fred C. Crawford, president, announced. The parent company has a backlog of \$30,000,000 of national defense business.

### U. S. Steel Sales for 1940 At \$1,146,000,000

• • • Dollar volume of business transacted by U. S. Steel Corp. in 1940 amounted to \$1,146,000,000, an increase of \$242,000,000 or 27 per cent over 1939, U. S. Steel Corp. said this week in its annual report on various phases of the company's business.

Steel corporation subsidiaries last year produced 22,933,653 tons of steel ingots, a larger tonnage than any year since 1929 and, despite the payment of \$85,000,000 to hundreds of taxing units from the federal government down, was able to report net earnings of \$102,211,282 compared with \$41,-119,934 in 1939.

"U. S. Steel Corp.," said Irving S. Olds, chairman, "is building destroyers and cruisers; it is developing additional armor plate facilities to meet the requirements of the naval and military programs; it is producing shell forgings, unloaded shells and bombs of various sizes; it is sending large quantities of steel to Great Britain and Canada; it is supplying a steady flow of steel to manufacturers in different parts of the country who have taken contracts with the Army or the Navy under the defense program; and its ocean-going steamers are bringing strategic materials from distant foreign ports to meet defense needs.'

Mr. Olds described the year's operation for the big steel company as follows: "During the year, U. S. Steel employed 254,000 people on the average and a vast number of tools, plants and other facilities of a value of about \$1,338,000,000 and belonging to about 217,000 stockholders, to produce

about 23,000,000 net tons of steel ingots and 13,000,000 barrels of cement; to complete 15 ships totaling approximately 100,000 gross tonnage; to provide millions of rail and water transportation miles."

Principal technological advances reported by U. S. Steel for the last 12 months include improvement in manufacture of armor plate, tank armor, shell steel, bomb forgings, performance of metals at high temperatures, further improvement of flat rolled products, development of welding technique, protective coatings for steel, concentration of lean ores, and new uses of steel for mobile equipment.

Studies of sizing and subsequent proportioning of blast furnace charges, particularly ore and coke, have resulted in uniformity and economy, along with a higher rate of production. Development of a new form of pyrometer with which to measure the temperature of molten steel is another important item.

U. S. Steel has contributed to the science of steel hardening by preparing graphical charts for evaluating hardenability in actual units and determining the depth of hardening under any conditions of size and quenching. The corporation has developed a testing tool for establishing precisely the factors involved in machining various steels. Continued research has aided in conservation of strategic metals, the corporation says.

Improvements now under way at various plants of U. S. Steel follow:

Birmingham: Installation of facilities for the increase of productive capacity for pig iron, ingots and rolled steel products; a battery of by-product coke ovens, a blast furnace and auxiliaries, a mill to roll wide plates; facilities for the production of shell forgings; sheet mill and cold-reduced tin plate equipment; additional equipment for ore and coal mines.

Chicago: Improving blast furnaces for increased output; construction of new electric furnace plant for increased stainless and alloy steel production; construction of new equipment to increase productive capacity for cold reduced tin plate; modernizing electrical distribution system; additional facilities for rolling small billets; rebuilding coke oven batteries; construction of soaking pits and installation of cranes for greater capacity and economy; sundry replacements of open hearth facilities and equipment.

Pittsburgh: Improving blast furnaces and auxiliary equipment for increased output; rebuilding and enlarging open hearth furnaces and auxiliary equipment; installation of cold reduction mill and other equipment to increase production of cold reduced tin plate products; additional power generation and distribution facilities to meet increased demand; replacement of wire drawing equipment to provide greater flexibility in meeting market needs; facilities for increasing output of armor plate (including installation of heat treating equipment), for fabricating light armor plate, and for producing bombs, shells and shell forgings, and welded steel barges.

Cleveland: Rebuilding blast furnace to increase capacity; installation of additional facilities for the production of cold rolled stainless steel strip and the construction of additional annealing facilities for strip steel.

Pacific Coast: Warehouse at San Francisco to afford better service to customers; installation of additional steel making and steel finishing facilities, including rope and fence products facilities.

Worcester: Reconstruction and rearrangement of wire product manufacturing facilities.

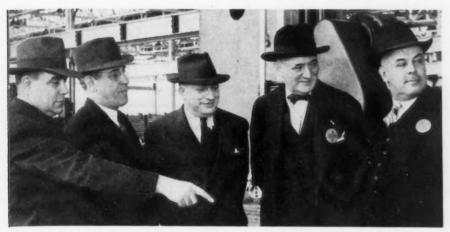
New Jersey-Pennsylvania: Additional facilities at Kearny, N. J., for construction of vessels for the government; construction of new cement mill at Northampton, Pa.

#### U. S. Steel's Production Figures for 1940

	Net'	Tons	Per Cent
Product Classification	1940	1939	Increase
Iron Ore	33,904,206	24,109,887	40.6
Manganese and Zinc Ores	142,354	115,010	23.8
Coal	29,527,686	21,623,834	36.6
Coke	16,143,957	12,091,676	33.5
Limestone and other Raw Materials	15,730,208	12,852,375	22.4
Pig Iron, Spiegel and Ferro-Manganese	18,366,576	13,655,719	34.5
Steel Ingots*	22,933,653	17,625,676	30.1
Rolled and Finished Steel for Sale	15,543,856	11,996,811	29.6

\*Ingot capacity as of January, 1941, was revised to 29,720,000 net tons, an increase of 1,925,000 tons over 1940.





KNUDSEN CHECKS UP: The new Chrysler tank arsenal being built at Detroit, is 85 per cent complete, has 50 per cent of its machinery installed for producing 25-ton tanks. Inspecting the plant a few days ago were, l. to r., E. J. Hunt, arsenal manager, Herman L. Weckler, Chrysler vice-president and general manager, Col. H. W. Rehm, Army commander of the arsenal, Mr. Knudsen and B. E. Hutchinson, Chrysler finance committee chairman.

#### Knudsen Sees All Auto Plants on Aircraft

Washington

• • • After discussing with Walter Reuther, labor leader, the CIO plan for producing aircraft engines in automobile plants, William S. Knudsen, OPM Director General, reports that, on the basis of manufacturing facilities at the Cadillac plant of General Motors, existing machine tools in the automobile industry are not adaptable for turning out aircraft engines under the extensive proposal known as the "Reuther plan."

Only 15 per cent of existing machines in that plant could be used for aircraft production.

While leaving no doubt that he considers the Reuther plan impracticable, Mr. Knudsen forecast that when the defense program gets under way virtually all automobile manufacturers will be participating in aircraft production largely through fabrication and sub-assembly work.

#### Plane, Other Orders Go To Automobile Plants

Washington

• • • The Navy Department has awarded a \$20,000,000 contract to Hudson Motor Co., for the construction and equipping of a plant near Centerline, Mich., in the Detroit area, for the production of machine guns, parts of gun mounts, torpedo directors and torpedo tubes.

Simultaneously, the Navy announced a \$427,900 contract with the Willys-Overland Motors, Inc., for the acquisition and installation at the company's Toledo plant of special additional equipment and facilities for the production of ordnance equipment.

The War Department has announced that "letters of intent" have been accepted by the Fisher Body Division of General Motors and by the Ford Motor Co., the former to expand its Memphis plant for the manufacture of bombing plane parts for the Government airplane plant at Kansas City, and the Ford company to build a plant at the airplane parts plant at Ypsilanti, Mich., to manufacture parts for the Consolidated B-240 heavy bomber. The Fisher expansion contract involves \$6,875,000, the buildings to cost \$2,400,000 and the machinery, \$4,-475,000. The Ford contract involves \$10,988,692 and calls for additional buildings, machinery, and machine tools. The parts to be made in the new plant will be assembled at the Fort Worth Consolidated plant, Fort Worth, Tex.

### Chicago Plant On 24-hr. Day

Chicago

• • • Chicago Extruded Metals Co. here has gone on a 3-shift, 6-day week to handle defense subcontracting business calling for extruded shapes in brass, nickel, silver and architectural bronze.

# Half Elyria, O., Plants Given Subcontracts

Elyria, Ohio

• • • Lorain County, roughly 20 miles west of Cleveland, is one of the bright spots in the Ohio industrial picture these days. Its two principal cities are Lorain, which is a Lake Erie port, and Elyria, about nine miles inland. Both are contributing manufactured products on an increasing scale to the national defense program. Wide diversity describes the industrial activities of the two cities, ranging from large steamships to fine lace.

At Lorain employment is back to approximately the 1929 peak of 14,000 workers. National Tube Co., the largest employer, has around 9700 persons on its payroll. Thew Shovel Co., large maker of power shovels, is employing around 900. American Shipbuilding Co., which has come to life in a big way during the past year, is employing about 900. The branch plant of American Stove Co. is the next largest employer with around 525 persons on its payroll. A beryllium plant operated by Brush Beryllium of Cleveland, has stepped its employment up from four to 54 persons. A number of small casting and stamping companies are very active. According to Elmer E. Meadley, secretary of the Lorain Chamber of Commerce, the city has vacant about 50,000 sq. ft. of space suitable for light manufacturing, a building formerly occupied in the manufacture of clothing.

At Elyria, approximately 8000 persons are employed in industrial plants today, the largest employer being Western Automatic Machine Screw Co. with approximately 1350 workers. The city has been filling up rapidly. About four years ago it had idle around 600,000 sq. ft. of floor space, principally in plants vacated by American Rolling Mill Co. and Willys-Overland Motors Co. All this space has been filled and about 400,000 additional sq. ft. of new space occupied. The new Bendix-Westinghouse plant will require around 500 workers, 300 coming from Pittsburgh. Elyria Foundry Co. has completed an expansion of 84,000 sq. ft. Duplex Mfg. &

Foundry Co. is adding 8000 ft. now. General Rivet & Machine Co. is building 13,000 sq. ft. Romec Pump, General Industries, Fox Furnace division of American Radiator and many other concerns have expanded.

The steady growth of Elyria's industries has drawn heavily upon the youth of agricultural areas for many miles around. The city has a housing problem.

It is estimated by H. W. Luethi, secretary of the Elyria Chamber of Commerce, that about one-half of Elyria's plants are working on subcontracts. In some cases output of individual plants is as high as 85 per cent on defense. Steps are being taken to train engineers and four courses conducted by graduate engineers will begin in early April.

Probably the most amazing upsurge of new business has been experienced recently by General Industries Co., large molder of plastics. Due to material shortages affecting peacetime products, scores of inquiries have been received recently from firms desirous of making parts out of plastics. Some of the recent inquiries border on the fantastic. Plastic sewer pipe and very large tanks are among the propositions recently put before the company. One large manufacturer of household equipment offered General Industries 200 molds representing parts where it desired to adopt plastics instead of stainless and other metals, but the Elyria company was able to accept only a few of the molds. Large agitators for washing machines are being made of plastics at the plant, an engineering triumph considering both the size of the part and the fact that agitators customarily suffer from the effect of soaps and hot

An Elyria manufacturer of alloy castings for heat treating furnaces reports a sharp step-up in orders. So far the nickel shortage has not interfered with this company's production. It was allocated for 1941 approximately 70 per cent of the nickel it used in 1940, but its casting business has increased 50 per cent or better over 1940.

A small Elyria manufacturer working on a subcontract from an

Eastern Navy yard reports considerable difficulty due to changing specifications. Working on an order placed last November, the firm received notification a couple of weeks ago that specifications would be changed. In addition to the loss on the raw material, the company expressed fear that around eight months would be consumed before the revised order could be completed. Most of the delay will be caused by waiting for materials.

There have been several instances where ideas or equipment have been offered to the govern-

ment by Elyria companies but rejected.

Most of the screw machines in Lorain county are running two shifts and some are operating three shifts. Considerable stamping capacity is available. One large maker of truck bodies has received direct awards from both the United States and British governments but not enough to cause any critical production problems.

The ceiling on the county's capacity to hire additional workers has not yet been reached, as extra shifts can still be added in many plants if necessary.

# Ordnance Program Must Be Tripled, Barnes Tells ASTE

Detroit

• • • Fulfilling of the requirements of the British War Office as a result of the passage of the lendlease bill, plus our own enlarged needs for manufacture of critical items for an army of 1,800,000 men, will mean that the ordnance production program launched last fall will have to be tripled, according to Brig. Gen. G. M. Barnes, assistant chief of ordnance, who spoke before a gathering of 300 engineers and executives at the preview dinner of the American Society of Tool Engineers.

The dinner, held in Detroit, March 24, marked the opening of the Machine and Tool Progress Exhibition being held at Convention Hall through Saturday of this week, at which 250 small tool, machine tool and other productive machinery makers have their products on display.

General Barnes indicated that from 1920 up until 1938, annual expenditures for ordnance material averaged \$12 million. In 1938, the appropriation was stepped up to \$50 million and in 1939 to \$130 million. Last fall \$1.2 billion worth of ordnance items were contracted for or initiated by letters of intent in a matter of six weeks, and \$600 million was allocated for the construction of 40 new arsenals. Production of small arms ammunition is to be expanded 25 to 30 times.

The speaker pointed out that most defense contractors started

out on the basis of getting new machine tools and many were holding up starting certain projects because of the lack of three or four essential tools because of the delayed delivery situation. General Barnes called upon manufacturers to make use of what equipment they had on hand and indicated that they would have to do some improvising in order to get things going. He also expressed the opinion that industry was devoting only about half its productive effort to defense and the rest to peacetime pursuits. Industry must give national defense higher priority and precedence in the shops, he said.

Speaking of time being the essence in war, General Barnes concluded: "This national production job must be completed quickly. We have the greatest potential munitions capacity in the world. Let us use such part of it as necessary to complete the requirements for critical military supplies as required by national defense at the earliest possible moment."

General Barnes was introduced by L. Clayton Hill, vice-president of manufacture, Murray Corp. of America. A. H. D'Arcambal, national president of the ASTE, spoke briefly. He indicated that the society has added 10 chapters in the past year, making 40 in all, and that the membership had increased 60 per cent, from 4400 to about 7000. Technical sessions were to be held every evening through Friday. Daylight hours are reserved for plant visitations and the exhibition, largest of the three held so far by the society. A large attendance of tool engineers and executives was expected.

# Ceiling Prices Fixed On Aluminum Scrap

Washington

• • • A price fixing order covering aluminum scrap and secondary aluminum, and a temporary allocation formula for defense and non-defense uses of aluminum and aluminum alloys this week entrenched the government deeper in its role of fixing prices and administering priorities.

The ceiling prices for aluminum scrap, pegged to current prices for virgin aluminum, were covered in the second series of price orders issued by the Price Stabilization Division of the National Defense Advisory Commission.

Recent reports to the Price Stabilization Division indicate that sales of aluminum scrap have brought prices as high as 32 cents a lb., or almost double the price of the virgin metal.

The new price schedule establishes two ceiling prices for aluminum scrap. The lower ceiling applies to the first sale of aluminum

scrap from the maker to any other person. The higher ceiling applies to any sale of aluminum scrap thereafter by any dealer or other person to any smelter, foundryman, fabricator, or other dealer. The two ceilings, fixed f.o.b. the point of shipment, will allow the dealer a margin of 1½ cents per lb. on clippings, borings and turnings, and 1 cent per lb. on other types of aluminum scrap.

The maximum prices for secondary aluminum ingot, also made f.o.b. the point of shipment, are applicable to any sale or purchase of secondry aluminum ingot by any person. These prices, which were described by Mr. Henderson as leaving a spread of 3 to 4 cents per lb. for the processors' costs and profits, were expected by government officials to give ample allowance for reasonable profit to both dealers and smelters. To forestall any attempt on the part of manufacturers and fabricators to purchase scrap from dealers, thereby circumventing the smelter, the price schedule requires dealers to report any sales made to any person other than a smelter.

While the maximum prices fixed in the schedule become immediately effective irrespective of any preexisting contracts, an exception was made in the case of smelters and dealers who have acquired inventories at prices above the new ceilings In order to carry out these firm commitments on the original terms, such smelters and dealers will be permitted an exception from the price schedules although officials emphasized that this privilege would not be extended beyond the amount of inventories already acquired to carry out the commit-

All defense orders for aluminum under the new formula are assigned an automatic preference rating of A-10, which is in lieu of the A-2 rating assigned on Feb. 24 when mandatory priorities were invoked in aluminum.

The allocation schedule, to be followed by producers, fabricators and secondary smelters in making deliveries until further notice, follows:

A. For Defense Orders as defined in General Preference Order No. M-1 (issued March 22) and for

15 SHIPS LOAD for Britain: Has the flow of war material to the United Kingdom since the \$7 billion Lease-Lend bill was passed gotten under way? This photo, showing 15 ships loading at a port in the New York area, suggests an answer.

More and more emphasis is being placed on speed in U. S. merchant ship production to offset the increase in British tonnage destroyed by German submarines, planes and by the two high-speed German battleships said to have been raiding for several weeks in the North Atlan-



Photo by International

### Maximum Prices For Aluminum Scrap

(f.o.b. point of shipment)

	Maximum (per p	
	Column	
Grade		II
of Aluminus		
Scrap		Dealer
Pure Clips		
Cable		14 1/2 c.
Segregated A		
Sheet Clips.	12c.	13½ c.
Old Sheet	and	
Utensils	12c.	13½c.
Mixed Sheet C		12½c.
Cast Scrap		/-
Forged Sci		
old and new		12c.
Borings and Tu		120.
ings other t		
		111/ -
No. 12		11½c.
No. 12 type I		
ings and Tu		
ings		11c.
Pistons free	of	
struts	11 1/2 c.	12½c.
Pistons v	vith	
struts	91/2 c.	101/2 c.

#### Maximum Prices For Secondary Aluminum Ingot

any other A ratings issued by the Priorities Division.

B-1. Each producer (not including fabricators) shall reserve 1 per cent of his scheduled production of aluminum ingot each month; deliveries shall be made out of such reserve only pursuant to orders issued against this reserve by the Priorities Division.

B-2. For repair or replacement parts for existing apparatus, equipment and devices which must continue to function in order to preserve essential services and maintain maximum production of goods.

B-3. For products essential to the protection of public health or safety

B-4. For standard apparatus, equipment or devices which cannot be re-designed to use substitute materials without serious interruption of current production and for which there is substantial use in national defense or in plants chiefly devoted to national defense.

B-5. For customers requiring less than a total of 1000 lb. of aluminum per month. This rating is temporarily assigned pending further investigation.

B-6. For customers whose use of aluminum does not exceed 2 lb. per \$100 of final sales value of the article of which it is an essential component. A large amount of labor is thereby kept employed with the use of relatively little aluminum.

B-7. For products in which no reasonably satisfactory substitute for aluminum is available.

B-8. For products in which a reasonably satisfactory substitute for aluminum is available or can be made available.

The preferential rating schedule also sets forth seven general provisions. Under one of these, orders having a preference rating of B-2 to B-8 inclusive were assigned a percentage of the customer's monthly average of 1940 from the same producer for corresponding purposes. These ranged from 80 per cent in the case of a B-2 rating down to 10 per cent for a B-8 rating. Under the instructions, deliveries by producers on contracts with these preference ratings will not exceed the percentages indicated.

The price fixing order on aluminum scrap became effective March 24. The allocation order became effective March 22.

### Scrap Consumption in February 4,172,000 Tons

••• Domestic consumption of iron and steel scrap in February, estimated at 4,172,000 gross tons by the Institute of Scrap Iron and Steel, Inc., set a new all-time high record on a daily average basis.

Annual consumption of scrap, on the January-February level, is now at the rate of 50,400,000 gross tons. The previous record year was 1940, when 41,687,000 tons were melted by steel mills and foundries.

### Union Finds 1800 Allis Strike Votes "Faked"

Milwaukee

• • • Union attorneys admit that their own handwriting expert, Mrs. Katherine Keeler, of Northwestern University, has discovered that 1800 fraudulent ballots (out of a total of 6759) had been cast in the Allis-Chalmers strike vote. This defection leaves the union minus enough bona fide votes to form a majority, which Wisconsin law prescribes as requisite for a strike vote. In a surprise mass meeting, held Monday night, the union admitted to its members that the strike vote was not legitimate. Nevertheless, union officials declared that the wrongful acts had no bearing on merits of the controversy between it and Allis-Chalmers and that the strike would be continued.

(Turn to page 83 for complete background story of how the Allis-Chalmers strike is affecting other defense plants.)

#### New Substitute For Aluminum Foil Offered

• • • Reynolds Metals Co., largest manufacturer of aluminum foil is ready with a substitute for aluminum foil used in making containers, according to F. A. Sunderhauf, general manager of the Display and Container Division. The new product, known as Reynolds Plastic Finish, was developed by the Reynolds Research Laboratory. Finish of the new product is equivalent to mat finished aluminum silver, gold and colored stock, and is produced by coating a highly calendared paper board with an aluminum powder compound made from scrap, covering with a clear or colored plastic fin-

This plastic finish, according to Mr. Sunderhauf, actually costs more money than aluminum. "However," he said, "we feel this new product eventually can be produced at a cost not much more than aluminum, and for this reason we are not increasing our prices wherever the plastic finish is substituted for aluminum."

### Strikers Threaten Defense Program in Blow at Bethlehem

Bethlehem, Pa.

• • • An attempt to stop production at one of the key U.S. defense plants-the Bethlehem Steel Co. works here-was made early this week when the SWOC masspicketed the plant and fought police in an attempt to prevent elections by another union, the Bethlehem E.R.P.

Sole issue in the attempted strike was to prevent voting in the annual E.R.P. election, although the SWOC's action seemed aimed at crippling the U.S. defense program at one of its most vulnerable points. (Bethlehem Steel has more than \$1.2 billions in defense orders.)

Pennsylvania state police were expected to be called to reinforce Northampton County and Bethlehem city peace officers and early

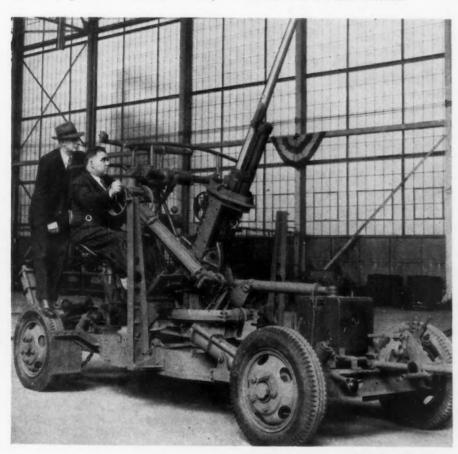
in the week the Bethlehem situation promised to become a national testing ground for union labor's right to stop industrial production at will despite the vital need of vastly increased production of planes, ships, tanks and

Other Bethlehem plants were to be struck if plans to carry out elections by the E.R.P. organization were carried out, according to union leaders.

#### Steel Wage Meetings Continue at Pittsburgh

Pittsburgh

• • • Conferences between SWOC and Carnegie-Illinois Steel Corp. officials are continuing this week with some announcement expected by next Tuesday when the 20-day deadline will have been reached. No definite indications of the trend in wage negotiations have filtered through the conferences but the belief remains that no serious difficulties will be encountered.



225 SUBCONTRACTORS helped build this 37 mm. anti-aircraft gun, the first produced by Aetna-Standard Engineering Co., Youngstown, at its Elwood City, Pa., plant. The gun will penetrate one-inch armor plate at 1500 yd. and can be used for combating tanks as well as planes. Ordnance officers praised Aetna-Standard this week for its speed in starting gun manufacture.

### Steel Strikes Staged To Block Defense-Dies

· · Charges that the Communist Party is working toward a complete tie-up of the steel industry were made this week at Washington by Chairman Dies of the House Committee on Un-American Activities.

In a speech inserted in the Congressional Record, Dies declared that: Our committee is in possession of indisputable evi-dence that the Communist Party, through its members and organ-izers in the SWOC, are working toward a complete tie-up in the steel industry, an industry which has billions of dollars in

defense contracts.

"Our committee is in possession of evidence which shows that hundreds of employees in steel mills have recently signed the Communist Party election petitions.
"It is an indictment of this

labor organization that it ever allowed so many Communists of public record to infiltrate into its organizing work. "Recent and threatened strikes

in steel plants have the sole purpose of obstructing the national defense program," Dies said.

(Mr. Dies apparently referred

to the threatened strike at Bethlehem Steel Co.'s Bethlehem,
Pa., plant, one of the most important U. S. plants from a
viewpoint of defense.)

He said he would place into the
record a list of names of per-

sons in the steel industry who had Communist affiliations.

#### Ravenna Ordnance Plant To Start Production July I

Ravenna, Ohio

· · · First operations in loading bombs and shells at the new ordnance plant near here will begin July 1, John H. Farrell, manager of the housing division of the Atlas Powder Co., said Friday night. The date is a month ahead of the scheduled start of the plant.

#### CIO Union Rejects Vote On Harvester Strike

Richmond, Ind.

• • • Proposal by the International Harvester Co. that a government supervised election be held to determine whether employees at its plant here want to strike was rejected by officials of the Farm Equipment Workers' Organizing Committee (CIO).

- R. C. Markle has been elected comptroller and assistant secretary, Carnegie-Illinois Steel Corp., Pittsburgh, succeeding William Donald, who has been made assistant to the vice-president in charge of finance. Mr. Donald, associated with U.S. Steel subsidiaries since April 1, 1905, was made comptroller of Carnegie-Illinois in 1936. Mr. Markle entered the employ of U.S. Steel Corp. subsidiaries at American Steel & Wire Co.'s Braddock, Pa., plant in 1901. He was made assistant auditor, Cyclone Fence Co., in 1926 and in 1935 was made vice-president and general manager. He became assistant comptroller, Carnegie-Illinois, in 1936, being made general supervisor of methods and procedure on Jan. 31, 1938.
- . D. W. Lee will coordinate product development for the entire line of Dodge Job-Rated trucks, both gas and diesel powered, in the future. Mr. Lee, who is a graduate of Massachusetts Institute of Technology, is a former member of the engineering department of Chrysler Corp., has been engaged in Dodge diesel truck sales promotion but has been given the title of sales engineer in charge of all Dodge truck work. T. A. Demetry, formerly of the Dodge service department, has been named assistant to Mr. Lee.
- R. H. Daisley, a vice-president of Eaton Mfg. Co., has been elected a new director of the company. He is in charge of the company's Wilcox-Rich division with headquarters at Detroit.
- A. M. Herrmann has been appointed general factory superintendent by Brillion Iron Works, Inc., Brillion, Wis. For the past 17 years Mr. Herrmann has been with the Belle City Malleable Foundry, Racine, Wis.
- R. L. Hamilton has been elected vice-president of the Dumore Co., Racine, Wis. Mr. Hamilton has been with the Dumore Co. since his graduation from the University of Notre Dame in 1934. He was advertising manager of the company from 1935 to 1937 when he took over the duties of sales manager. He is a member of the board of controls of the Electric Tool Institute, the American Supply and Machinery Manufacturers

Change is inevitable
in progressive
Industry •
Change is
constant •

Association and is president of the Milwaukee Association of Industrial Advertisers.

• Walter Wollaston, for many years general production superintendent of the Brunswick-Balke-Collender Co. of Muskegon, Mich., has been named works manager of the Vega Airplane Co. In addition to his work at Brunswick-Balke-Collender, Mr. Wollaston spent five years with the Du Pont Co. at Deep Water, N. J. Following his graduation from Armor Institute of Technology, Chicago,



DEAN ROLLANS, whose appointment as general sales manager of the Wickwire Spencer Steel Co. and its subsidiary, the American Wire Fabrics Co., was announced in these columns last week.

in 1917, Mr. Wollaston served in the Chemical Warfare Division of the Army, manufacturing toxic gases.

- A. E. R. Peterka, executive engineer of Lamson & Sessions Co., Cleveland, became a major in the United States Air Corps Specialist Reserves in Mexico City recently. Taking the oath in a foreign country came about because Mr. Peterka happened to be on a combination vacation and business trip. His notification was forwarded from Texas and he promptly went to the American Vice Consul in Mexico City. Last week he returned to Cleveland, awaiting a possible call for active duty.
- Newton P. Selover, for the past seven years Pacific Coast representative of the locomotive equipment division of Manning, Maxwell & Moore, Inc., has been named Western sales manager with headquarters in Chicago.
- W. Houlton Blankley has been appointed district sales manager of the accessories division of the Stewart-Warner Corp., Chicago. His duties will consist largely of supervising the national accessory servicing training schools conducted by Stewart-Warner's accessory division. Before going to the Stewart-Warner Corp., Mr. Blankley was a member of the sales division of the Standard Oil Co. of Indiana.
- Ray P. Farrington has resigned as trustee and vice-president in charge of sales of the Alloys Plating Laboratories, Pittsburgh, and is now with the Army Ordnance Department as chief inspector of the Philadelphia Ordnance District.
- · W. W. Tomes has been appointed to head the flow meter section of the Cochrane Corp., Philadelphia. Mr. Tomes was graduated from Purdue University in 1928 and has been associated with the Firestone Tire & Rubber Co. in flow measurement and steam distribution work and. more recently, in meter field engineering and sales work. Assisting Mr. Tomes will be W. C. Morrison, formerly associated with the Brooklyn Union Gas Co. as a sales engineer. Mr. Morrison attended the University of North Carolina and was graduated from Brooklyn Polytechnic Institute in 1936.



RALPH K. CLIFFORD, member of the board of directors of the Continental Steel Corp., Kokomo, Ind.

- Ralph K. Clifford, since 1939 vice-president in charge of operations for all of the plants of the Continental Steel Corp. at Kokomo and Indianapolis, Ind., and Canton, Ohio, has been elected a member of the board of directors of the company. Mr. Clifford began his career in the steel industry in 1907 with the Kokomo Steel & Wire Co., which in 1927 became a part of the Continental Steel Corp. In 1916 he was named chief chemist of the Kokomo plant, and later also held positions as chief metallurgist and chief inspector. He was appointed assistant general superintendent of the Kokomo plant in 1923, becoming general superintendent two years later and works manager in 1937.
- Stanley H. Rose, for nine years manager of the export department of J. L. Lucas & Son, Inc., Bridgeport, Conn., has resigned from that company.
- Paul Helms has been named purchasing agent of the Roller-Smith Co., Bethlehem, Pa., effective April 1, upon the resignation of Harry A. Cassler, who held the position for the past 20 years. Mr. Helms joined the Roller-Smith Corp. in 1926 as an inspector. One year later he was transferred to the production department where he remained until he was ap-

pointed assistant production manager in 1930. In 1939 he became assistant purchasing agent which position he held until his present elevation to the post of purchasing agent.

- Col. Carl M. Tichenor has been appointed executive vice-president and general manager of the Doyle Machine & Tool Corp., Syracuse, N. Y., and a member of the board of directors. Col. Tichenor was formerly general manager of the Muskegon division of the Brunswick Corp. and during the last war served the United States government as chief of aircraft engine inspection and later chief of aircraft armament production.
- Charles F. Northup who has been in charge of the Syracuse office of Brown & Sharpe of New York, Inc., will retire from active service on March 31. Mr. Northup went with the Brown & Sharpe Mfg. Co. as an apprentice in 1880. For the present, the Syracuse office will be under the direction of Charles J. Vevera who has been assistant to Mr. Northup for the past 15 years.
- Charles H. Hoefer has been made general superintendent of the Duraloy Co., Scottdale, Pa. Mr. Hoefer was formerly superintendent of the alloy division, Lebanon Steel Foundry, Lebanon, Pa., and also superintendent of the Forging & Casting Corp., division of Allegheny Ludlum Steel Corp., Ferndale, Mich., and Empire Steel Castings, Inc., Reading, Pa.
- Harvey T. Harrison, general sales manager of the Duraloy Co., since 1937, has been elected vice-president in charge of sales. He first joined the Duraloy Co. in 1928 in the New York office. In 1930 he became district manager at Cleveland where he remained until 1937. Mr. Harrison is a graduate of Lafayette College.
- Millard E. Price has been appointed to the newly-created post of controller of Thompson Products, Inc., Cleveland.
- Frederick A. Ohlmstead has been appointed district sales manager with headquarters in Cleveland of the Youngstown Sheet & Tube Co., Youngstown.



LEE H. HILL, assistant manager of the electrical department of the Allis-Chalmers Mfg. Co., Milwaukee.

- · Lee H. Hill, head of the transformer department of the Allis-Chalmers Mfg. Co., Milwaukee, since 1936, has been appointed assistant manager of the company's electrical department. Mr. Hill served two years as an instructor in electrical engineering at Cornell University immediately following his graduation from that institution; then became associated with the Westinghouse Electric & Mfg. Co. as transformer design engineer and as engineer in charge of the power transformer development. For a number of years he was manager of the transformer division of the American Brown Boveri Co., and joined the Allis-Chalmers company in 1931 when it absorbed Brown Boveri.
- George B. Beitzel, manager of sales of the Pennsylvania Salt Mfg. Co., Philadelphia, manufacturer of metal cleaners, has been elected president of the Sales Managers' Association of Philadelphia and will assume his duties at the fall meeting of the association.
- Carlton B. Smith, formerly district service engineer of Allis-Chalmers Mfg. Co. in the Southeast, has been promoted to district superintendent of service and

erection with headquarters in the Healey Building at Atlanta, Ga.

- Lou R. O'Connor has been made representative of Ampco Metal, Inc., Milwaukee. His territory will include the states of Washington, Oregon, Idaho and western Montana.
- B. F. Bower, formerly chief engineer of the Howell Co., St. Charles, Ill., has resigned to organize a company that will shortly go into production on tube fabricating machines.
- Paul B. Morgan, president for the past 30 years and in the service of the company for 50 years,

has been elected chairman of the board of directors of the Morgan Construction Co., Worcester. J. W. Sheperdson has become executive vice-president with James A. Buell, former chief engineer, and Myles Morgan, heretofore assistant chief engineer, becoming vice-presidents of the company.

- L. A. Estes has been elected president of South Chester Tube Co., Chester, Pa., succeeding the late Gustavus W. Cook. Mr. Estes was formerly executive vice-president. John W. Lawton, continuing as secretary, has also been elected treasurer, succeeding Francis J. Tucker, who is joining the sales department as special representative.
- manager of its Salt Lake City branch. He was a graduate of St. John's Military Academy, Dellefield, Wis., and the University of Minnesota. He was 55 years old.
- Roy L. Stofer, 67, secretary and manager of sales of the Paterson-Leitch Co., Cleveland, died March 18 in Tucson, Ariz., after a long illnes. Mr. Stofer, had been a Paterson-Leitch salesman and official since 1920. Previously he had been employed by Republic Steel Corp. and the old Bassett-Presley Co.
- Alex Humbel, founder and president of the Pioneer Machine & Engineering Co., Cleveland, for 26 years, died March 18 in Cleveland, aged 59 years.
- Earl L. Raysor, sales manager in the Pittsburgh district for the Shaw-Box Crane & Hoist division of Manning, Maxwell & Moore Steel Corp., Youngstown, died March 15 at Youngstown. After graduation from Virginia Polytechnic Institute he joined the Youngstown Sheet & Tube Co. at Brier Hill in 1913 and later was an employee of the Valley Mould & Iron Co., Chicago.
- Charles R. Putnam, aged 78, superintendent in various mills of American Steel & Wire Co. for 50 years, until his retirement in 1932, died March 14 at Cleveland after a two-months' illness.
- Charles I. Ritchie, 49, manager of the western sales development department of Dyer Engineers, Inc., since last May, and formerly executive secretary of the Gray Iron Founders Society, Inc., for six years, died March 14 in a Cleveland hospital.
- David White, who organized the David White Co., Milwaukee, died March 16 at his home there. Born in Hungary 66 years ago, he came to the United States as a youth. After studying optometry and the manufacture of scientific instruments in New York and Philadelphia, he came to Milwaukee in 1894 and entered the retail business. He set up his own company in 1912 and in 1927 sold the firm to his employees so that he could again enter the retail field.

# Obituary

- James G. Duff, employed 23 years in the laboratory of Ford Motor Co., died recently in Detroit. Born in St. Andrews, Scotland, in 1872, he had lived in Detroit since 1907. In 1901 he organized the Tyneside Scottish Volunteer Corps in Newcastle, England, for which he was decorated by the British Parliament.
- William N. McMunn, founder and president of Michigan Seamless Tube Co., South Lyon, Mich., died recently in Detroit. He was a veteran of the Spanish-American War and was retired as captain of the United States Navy at the end of the World War. He was born in St. Louis, Mo., 61 years ago.
- John J. B. Trix, secretary-treasurer of the American Injector Co., Detroit, died in his office on March 5. Born 68 years ago in Detroit's old Corktown section, the son of John Trix, founder of American Injector Co., he was a graduate of the University of Michigan engineering college. He began his career in the foundry business, served as vice-president of the injector company until his father's death in 1932, then became secretary-treasurer in association with his brother Herbert, now president.

- R. M. Sheak, sales representative in the New York division of the National Acme Co., died at Elmira on Feb. 21.
- · Gifford Kingsbury Simonds, manufacturer, banker and author, died March 20 at his home in Brookline, Mass. Mr. Simonds was president and general manager of the Simonds Saw & Steel Co., Fitchburg, Mass., for 30 years, author of numerous treatises on business and economics, and a director of the Old Colony Trust Co., Boston. He had also served as president of the Waltham Watch Co., Waltham, Mass., the Hunter Arms Co., Fulton, N. Y., and Marschalk & Pratt, Inc., New York. Mr. Simonds was born in Fitchburg 60 years ago.
- William P. Shine, president and owner of the former Boston Structural Steel Co., Cambridge, Mass., died March 17. He was born in Ireland 69 years ago and came to this country when 13 years old, shortly thereafter entering the steel business with which he was associated for 40 years.
- Monroe H. Hanauer, Pacific Cast manager of Minneapolis Steel & Machinery Co. division of Minneapolis-Moline Power Implement Co. for the past 18 years, died last week in Hollywood, Cal., after a long illness. He had been connected with this company for 32 years and formerly served as

# Metal Working Activity

#### Latest Data Assembled by The Iron Age

From Recognized Sources. In Net Tons.

Steel Ingots:	Jan. 1941	Dec. 1940	Jan. 1940	12 Months 1940	12 Months 1939
Monthly output <sup>a</sup>	6,943,084 1,567,288 97.1	6,493,849 1,469,197 94.1	5,768,729 1,302,196 83.4	66,993,219 1,281,431 82.1	52,798,714 1,012,634 64.7
Pig Iron:					
Monthly output <sup>b</sup>	4,663,695	4,547,602	4,032,022	46,948,906	35,317,374
Raw Materials:					
Coke output <sup>c</sup> Lake Ore consumed <sup>d</sup> Scrap iron consumed	5,446,989 7,090,740 4,280,000	5,352,930 $6,913,803$ $4,424,000$	4,945,368 5,924,025 4,010,720	56,747,585 69,917,472 46,689,000	44,425,123 49,684,644 39,207,000
Castings:					
Malleable, orderse	81,089 110,579	66,665 115,343	40,438 43,121	571,929 816,919	489,482 685,074
Finished Steel:					
Trackwork shipments <sup>a</sup>	6,835 258,499 1,682,454	7,151 203,124 1,544,623	6,762 81,689 1,145,592	79,539 1,748,144 14,976,110	68,663 1,305,049 11,707,251
Fabricated Products:					
Automobile production <sup>h</sup> Steel furniture shipments <sup>e</sup> , value. Steel boiler orders <sup>e</sup> (sq. ft.) Locomotives ordered <sup>1</sup> Freight cars ordered <sup>1</sup> Machine tool index <sup>1</sup>	500,931 \$3,152,013 2,210,047 78 14,118	483,567 \$ 3,582,978 1,562,611 80 7,637 96.8	432,279 \$2,263,633 534,455 50 479 93.3	4,469,354 \$29,759,591 17,233,295 677 64,871 93.6†	3,577,292 \$22,609,168 11,098,316 415 56,915
Foundry equipment index* Gear sales index	285.3 259	257.8 208	149.0 123	183.7† 155†	103†
Non-Ferrous Metals: (U. S. only)					
Lead shipments <sup>1</sup> Lead stocks <sup>1</sup>	55,711 47,248	56,755 40,926	39,875 68,539	603,143	555,074
Zinc shipments <sup>m</sup>	63,272	65,385	54,862	696,497	598,972
Zinc stocks <sup>m</sup> Tin deliveries <sup>n</sup> Refined copper deliveries <sup>o</sup> Refined copper stocks <sup>o</sup>	8,768 14,291 119,736 116,341	12,884 10,481 112,671 142,772	63,532 10,954 91,428 135,441	129,357 1,001,886	80,523 814,407
Exports:					
Total iron and steel <sup>p</sup>	******	901,777 410,194 319,193 - 78,378	653,544 328,559 88,068 209,974	11,881,663 4,590,734 3,310,718 3,161,859	6,805,600 2,109,527 368,360 3,977,780
Imports:					
Total iron and steel <sup>p</sup>	*****	4,552	9,267 2,144	64,179 11,471	352,980
Pig iron <sup>p</sup> All rolled and finished steel <sup>p</sup>		263	2,144 2,559	14,830	43,223 175,512

Sources of data: "American Iron and Steel Institute; "The Iron Age; Bureau of Mines; Lake Superior Iron Ore Association; Bureau of the Census; American Institute of Steel Construction; United States Steel Corp.; Preliminary estimates by The Iron Age—Final figures from Bureau of the Census, U. S. only; Railway Age; National Machine Tool Builders Association; Foundry Equipment Manufacturers Association; American Bureau of Metal Statistics; American Zinc Institute; New York Commodity Exchange; Copper Institute; Department of Commerce; Institute of Scrap Iron and Steel; American Gear Manufacturers Association.

\* Not available. † Monthly averages.

# The Gron Age Comparison of Prices

#### Advances Over Past Week in Heavy Type; Declines in Italics

N		Mar. 18,			Mar. 25, Mar. 18, Feb. 25, Mar. 26
DI-4 D-W-1 G4-1	1941	1941	1941	1940	1941 1941 1941 1940
Flat Rolled Steel:					Pig Iron:
(Cents Per Lb.)					(Per Gross Ton)
Hot rolled sheets	2.10	2.10	2.10	2.10	No. 2 fdy., Philadelphia. \$25.84 \$25.84 \$25.84 \$24.84
Cold rolled sheets	3.05	3.05	3.05	3.05	No. 2, Valley furnace 24.00 24.00 24.00 23.00
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50	No. 2, Southern Cin'ti 24.06 24.06 24.06 23.06
Hot rolled strip	2.10	2.10	2.10	2.10	No. 2, Birmingham 20.38 20.38 19.38 19.38
Cold rolled strip		2.80	2.80	2.80	No. 2, foundry, Chicago†. 24.00 24.00 24.00 23.00
Plates	2.10	2.10	2.10	2.10	Basic, del'd eastern Pa 25.34 25.34 25.34 24.34
T. 1 T. DI 4					Basic, Valley furnace 23.50 23.50 23.50 23.50
Tin and Terne Plate:					Malleable, Chicago† 24.00 24.00 24.00 23.00
(Dollars Per Base Box)					Malleable, Valley 24.00 24.00 24.00 23.00
Tin plate		\$5.00	\$5.00	\$5.00	L. S. charcoal, Chicago. 30.34 30.34 30.34 30.34
Manufacturing ternes	4.30	4.30	4.30	4.30	Ferromanganese;120.00 120.00 120.00 100.00
Bars and Shapes:					tThe switching charge for delivery to foundries in the Chicag
(Cents Per Lb.)					The second secon
Merchant bars		2.15	2.15	2.15	Scrap:
Cold finished bars		2.65	2.65	2.65	(Per Gross Ton)
Alloy bars	2.70	2.70	2.70	2.70	Heavy melt'g steel, P'gh.\$21.00 \$21.00 \$21.00 \$16.75
Structural shapes	2.10	2.10	2.10	2.10	Heavy melt'g steel, Phila. 20.00 20.00 20.00 16.75
					Heavy melt'g steel, Ch'go 20.00 20.00 19.25 15.37
Wire and Wire Products:					Carwheels, Chicago 20.25 20.25 20.25 16.75
(Cents Per Lb.)					Carwheels, Philadelphia . 23.00 23.00 23.00 20.25
Plain wire		2.60	2.60	2.60	No. 1 cast, Pittsburgh 23.25 23.25 22.25 18.25
Wire nails	2.55	2.55	2.55	2.55	No. 1 cast, Philadelphia. 25.75 24.50 23.75 20.25
Rails:					No. 1 cast, Ch'go (net ton) 21.25 21.25 19.75 13.25
(Dollars Per Gross To	10				Coke, Connellsville:
Heavy rails		\$40.00	\$40.00	\$40.00	
Light rails		40.00	40.00	40.00	(Per Net Ton at Oven)
anglie rans	40.00	40.00	40.00	40.00	Furnace coke, prompt \$5.625 \$5.50 \$5.50 \$4.00
Semi-Finished Steel:					Foundry coke, prompt 6.25 5.75 5.75 5.25
(Dollars Per Gross Tor	n)				Non-Ferrous Metals:
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00	(Cents per Lb. to Large Buyers)
Sheet bars		34.00	34.00	34.00	Copper, electro., Conn.* 12.00 12.00 12.00 11.50
Slabs		34.00	34.00	34.00	
Forging billets		40.00	40.00	40.00	Copper, Lake, New York. 12.00 12.00 12.00 11.50 Tin (Straits), New York. 52.50 52.25 52.00 46.00
					Zine, East St. Louis 7.25 7.25 52.00 46.00
Wire Rods and Skelp:					
(Cents Per Lb.)					
Wire rods	2.00	2.00	2.00	2.00	Antimony (Asiatic), N. Y. 16.50 16.50 16.50 16.50
Skelp (grvd)		1.90	1.90	1.90	*Mine producers only.

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The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 131-140 herein.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

# Composite Prices

FINISHED STEEL			PIG	IRON	SCRAP STEEL			
March 25, 1941		\$23.61 a \$23.61 a \$23.45 a	Gross Ton Gross Ton Gross Ton Gross Ton	\$20.33 a \$20.33 a \$20.08 a	Gross Ton Gross Ton Gross Ton Gross Ton			
	High		High	Low	High	Low		
1940 1939 1938 1937 1936 1935 1934 1933 1932	2.286c., Jan. 3 2.512c., May 17 2.512c., Mar. 9 2.249c., Dec. 28 2.062c., Oct. 1 2.118c., Apr. 24 1.953c., Oct. 3 1.915c., Sept. 6 1.981c., Jan. 13	1.792c., May 2 1.870c., Mar. 15 1.883c., Dec. 29	14.81, Jan. 15.90, Jan.	3 22.61, Jan. 2 9 20.61, Sept. 12 1 19.61, July 6 9 20.25, Feb. 16 4 18.73, Aug. 11 17.83, May 14 1 16.90, Jan. 27 1 13.56, Jan. 3 1 13.56, Dec. 6 1 14.79, Dec. 15	\$22.00, Jan. 7 21.83, Dec. 30 22.50, Oct. 3 15.00, Nov. 22 21.92, Mar. 30 17.75, Dec. 21 13.42, Dec. 10 13.00, Mar. 13 12.25, Aug. 8 8.50, Jan. 12 11.33, Jan. 6	16.04, Apr. 9 14.08, May 16 11.00, June 7 12.92, Nov. 10 12.67, June 9 10.33, Apr. 29 9.50, Sept. 25 6.75, Jan. 3 6.43, July 5 8.50, Dec. 29		
1930	2.236c., May 28 Based on steel plates, wire, rails and hot-rolled str	1.962c., Dec. 9 2.192c., Oct. 29 bars, beams, tank , black pipe, sheets ip. These products cent of the United	18.71, May 14 Based on avera Valley furnace a Chicago, Philade	7 15.90, Dec. 16 4 18.21, Dec. 17 ges for basic iron at and foundry iron at lphia, Buffalo. Val- iron at Cincinnati.	steel scrap quota			

# Summary of the fleek

OTWITHSTANDING the fact that ingot production has risen to 100 per cent of the steel industry's capacity, which on a tonnage basis is a rate never before attained, and which means that approximately 1,125,000 tons of semi-finished and finished steel is being turned out a week, the call for more and more steel is creating fresh problems for the industry.

While up to this time the steel companies have been able to take care of the regular requirements of defense and non-defense customers with a minimum of delay, the expansion and speeding up of work for the "Arsenal of Democracy" now threatens to disrupt mill schedules to a considerable extent so far as civilian customers are concerned.

Sheets and strip, on which mill schedules are already far extended, may be subject to further delays because of the possibility that some of the continuous sheet-strip mills may be obliged to roll larger tonnages of plates for the merchant shipbuilding program. The allocation of 520,000 tons of steel, mostly plates, for the 200 simplified merchant ships to be built for the United States has already created a problem, but on top of this about 800,000 tons of additional steel will be required later on for at least 300 more ships now under consideration.

THE Iron and Steel Defense Committee, recently formed by executives of the steel industry, and officials of the Office of Production Management are now seeking a solution to this situation. Whether mandatory priorities are adopted for plates or not, the result will be much the same because additional time spent in rolling plates on continuous mills will displace other products also rolled on those mills. The automobile industry and other large users of sheets and strip are likely to be affected soon by restricted shipments of the steel they have on order.

One of the principal tasks to be undertaken by the Iron and Steel Defense Committee is the allocation of government orders for steel, which will probably be done henceforth on the basis of capacity of individual plants. Considerable dissatisfaction has arisen within the industry because some producers have been forced to take more than their pro rata share.

At a time when the steel industry is trying to bend every effort to the getting out of steel to meet the unprecedented demand, strikes and threats of strikes are causing grave concern as to the possibility of serious disruption of the defense program at its most crucial period. Unless the newly formed National Labor Mediation Board is given statutory authority by Congress it can do little to prevent strikes.

Conferences over wages and other differences are

• Ingot production hits 100 per cent but steel sales show no abatement . . . Speeding up of shipbuilding and other defense work creates problem in handling of large plate orders...Strikes continue to threaten defense program . . . Scrap prices to be announced late this week

being held again this week by the Carnegie-Illinois Steel Corp. and the Steel Workers Organizing Committee. Whether an agreement is arrived at this week or not, it will become necessary for U. S. Steel subsidiaries to make a price announcement of some kind for second quarter before March 31. Such announcement might contain an escalator clause.

Despite the fact that many steel companies are turning down a great deal of business, steel orders in total volume show no abatement. In fact, March business will exceed that of February and may go higher than January totals, which for some companies were the largest in their history. Some steel companies are virtually out of the market for the remainder of the year on major products, exceptions being pipe and some wire products. Sales of galvanized sheets are closely restricted because of zinc shortage.

DEFENSE orders of all types continue to increase and are forming a larger proportion of aggregate steel business. A considerable volume of shell steel business is in early prospect as shell plants approach completion of tooling.

Some steel buyers have been traveling around the country trying to buy from warehouses far removed from their own plants. Exporters are having extreme difficulty in placing orders with the mills even when offering premiums.

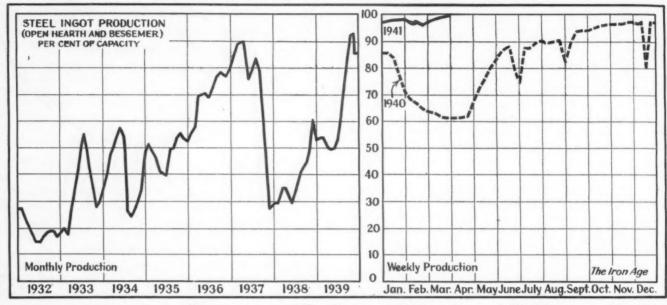
Having named ceiling prices for scrap and remelt aluminum, the price stabilization division of the National Defense Commission expects to name ceiling prices and differentials on iron and steel scrap late this week. These prices will apply to export as well as domestic trade and will cover all items sold by the railroads. Pending this announcement, which has been delayed beyond the time it was originally expected, steel grades have been marking time, but cast scrap is approaching a condition of extreme scarcity and prices have been advancing for several weeks. A contributing factor in the cast scrap situation is the growing shortage of pig iron.

# The Industrial Pace

A SHARP DROP in automobile production and a slump in heavy construction activity lowered THE IRON AGE index of capital goods activity 2.7 points in the past week to 119.0, as compared with 121.7 in the preceding week, 125.0 a month ago, and 77.9 in the corresponding week of 1940. Automobile assemblies declined to 124,805 from 131,410 two weeks ago and heavy engineering construction awards were off to \$89,558,000 from \$132,626,000 in the previous week. Steel ingot production rose to 99.5 per cent of capacity, while the loading of forest products increased from 38,375 to 39,444 cars.

TOTAL COPPER DELIVERIES to domestic consumers in February, 112,808 tons, were below the January total of 119,736 tons but, on a daily basis, were up 4.3 per cent, and were 85 per cent above February, 1940. Estimated average weekly carloadings of revenue freight in March are 752,428, up 6½ per cent from the February average of 706,047, and 20 per cent ahead of March, 1940. Despite maximum prices recently introduced by the government on steel scrap, THE IRON AGE scrap composite crept upward 25c. in four weeks to \$20.33, comparing with \$16.54 in the week ended March 19, 1940.

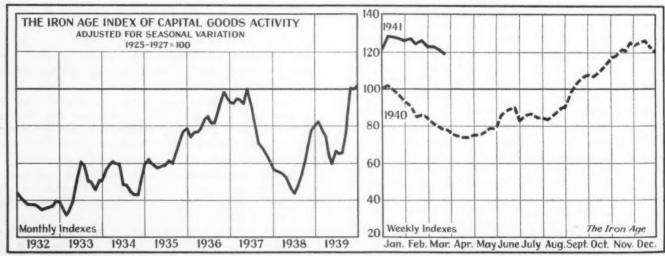
### Ingot Production Hits 100% of Rated Capacity



District Ingot Production, Per Cent of Capacity Previous Week...

Wheel-ing Detroit Southern River Pitts-burgh Cleve-land Phila-Chicago Valleys delphia Aggre-gate Buffalo St. Louis 101.0 85.0 100.0 101.0 101.0 100.0 96.0 106.0 95.0 107.0 102.5 111.0 101.0 101.5 990 96.0 100.0 106.0 850 96.0 95.0 103.0 102.5 111.0

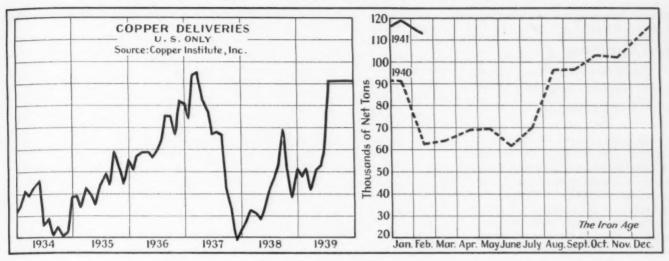
### Auto, Construction Losses Lower Index



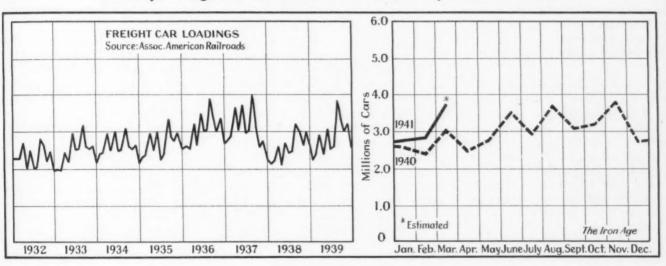
Mar. 23 Mar. 23 Week Ended ➤ Mar. 22 Feb. 22 **♥** Component Mar. 15 1940 1929 Steel ingot production<sup>1</sup> Automobile production<sup>2</sup> Construction contracts<sup>3</sup> 130.8 130.3 129.9 80.5 119.2 124.7 135.0 95.2 127.2 151.3 158.1 158.6 71.9 142.4 Forest products carloadings<sup>4</sup>... 71.9 Pittsburgh output and shipments<sup>5</sup> 126.2 70.1 73.7 56.3 119.2 125.4 127.9 85.4 116.5 COMBINED INDEX ..... 119.0 121.7 125.0

Sources: ¹The Iron Age; ²Wards Automotive Reports; ²Engineering News-Record: ⁴Association of American Railroads; ⁵University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended March 15. Other indexes cover week of March 22.

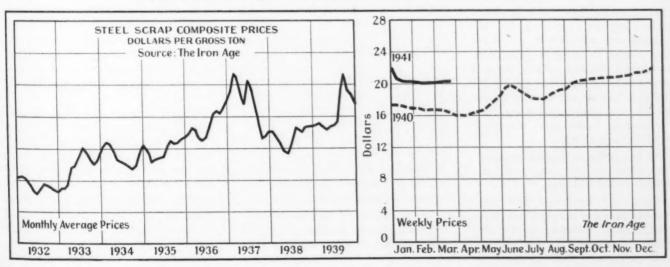
### February Copper Deliveries Increase on Daily Basis



### Weekly Freight Movement in March Expands 6 1-2 %



### Scrap Prices Higher Despite Government Ceiling



# Market News

#### . . . THE WEEK'S ACTIVITIES IN IRON AND STEEL

#### New Business

... Heavy ship building requirements further complicate delivery problem

PITTSBURGH reports no letup in the volume of fresh orders. Bookings are running from 5 to 8 per cent ahead of the same February period. Tightest carbon steel product is plates, delivery of which for shipbuilding purposes was being discussed early this week by steel industry officials, defense executives, and Navy officers.

With 200 "ugly duckling" merchant ships having been awarded to several shipyards and with 520,000 tons of plates and shapes for the production of these ships having been allocated among steel makers, an additional placement of 300 simplified merchant ships is expected soon.

It is understood that the first 200 ships will be built in normal fashion at the shipyards but there is a possibility that the subsequent 300 boats may possibly be pre-fabricated in part at least before being assembled at shipyards. This latter method may be taken to expedite production and also to attempt an elimination of a possible jam up at shipyards.

If this pre-fabricating plan is utilized, the boats would undoubtedly be welded and partially fabricated at inland plants and later shipped to an assembly point where other machinery can be installed.

There is a possibility that high speed continuous strip mills may be assigned production of light gage plates in order to facilitate this shipbuilding program. Such a move, should it develop, will of necessity, affect production of sheets and strip and this is causing concern among automobile manufacturers in particular.

For the 300 additional ships ordered, steel requirements would approximate 800,000 tons.

Augmented by large purchases of steel plates for shipbuilding, new tonnage last week at CLEVELAND was even heavier than usual. In a single day one CLEVELAND com-

pany's sales shattered all previous records. In fact, the amount booked that day was greater than monthly shipments in some of the lean years of the not too distant past.

Much buying is still overhanging the market at CLEVELAND. Probably the largest tonnages are embodied in construction. This week initial inquiries for the new Plum Creek ordnance plant near Huron, Ohio, appeared, and there will be large inquiries and awards for a number of new manufacturing plants.

Northern Ohio will be called upon for much shell production in order to feed the new Ravenna plant, which expects to begin loading operations July 1. Large amounts will be spent for machinery and raw materials by shell producing plants. If desired on short notice fitting into steel mill schedules some of the big tonnages for shell steel, bomb racks and kindred material will tax the ingenuity of mill operators.

The Inland Steel Co., Chicago, last week sent the following letter to its customers:

"For six months orders have been received by us in tonnages exceeding our productive capacity. This has resulted in a substantial increase in our backlogs and a corresponding extension of delivery promises.

"Much of the tonnage now reaching us is being placed with a view toward securing protection. That is, customers fearful of losing a place in future schedules are sending in specifications for remote deliveries. Very few buyers can accurately forecast their requirements six, nine or 12 months in advance and therefore most of these orders are subject to change. This will call for an excessive and we believe needless amount of clerical work in our customers' offices and in our own.

"Because we believe this practice is unsound as well as unnecessary, we have adopted the following plan:

"1. Effective at once we will accept only such orders as can be included in our 1941 schedules and these only in relation to previous

sales. As heretofore all such orders will be subject to prices in effect at the time of shipment.

2. Except for tonnage required for definite contracts in connection with the defense program, no orders for 1942 delivery will be accepted until our books are opened for the first quarter of 1942. Our customers will be duly notified when this is done. If present conditions prevail at such time it will be our intention to (a) first provide for our proper share of the defense tonnage and (b) allocate the remaining tonnage equitably among our customers in relation to previous sales.

"3. All commitments and schedules are, of course, subject to any government regulations which may be imposed.

"4. Because of this plan our weekly rolling program will be discontinued until further notice.

"We greatly appreciate your cooperation during these difficult and unusual times and assure you of our desire to serve you to the very best of our ability.

"Yours very truly,
"INLAND STEEL CO."

New orders have edged off slightly in CHICAGO. This is especially true of the number of orders, though tonnage generally is equal to that booked in the previous week and ahead of the past month. The percentage of direct defense business is steadily increasing at all mills.

There have been a few cases where small plants in Eastern Pennsylvania have had to suspend certain operations temporarily because of a delay in the shipment of steel, but these have been comparatively infrequent and of short duration.

The BUFFALO district's largest mill at present is turning down a far larger quantity of steel orders than is being accepted. Mills there are booked solidly on many steel products right up to January, 1942.

With bookings undiminished at BIRMINGHAM, one producer there places delivery of sheets on current orders at from two to six months, bars at from three to six months.

#### Prices

... No changes for second quarter expected

Opinion in the steel industry is that there will be no change in the base price of steel products for second quarter regardless of the outcome of wage negotiations. Should a rise in steel prices materialize, a remote possibility, because of increased wages, such a price advance would be small and would be restricted to that portion of increased cost which could not be absorbed by economies.

The steel industry must find some means of posting second quarter prices by April 1. If the wage negotiation situation is not clarified by that time, it is logical to expect some type of "escape" clause in the price announcement which will protect steel companies in case final wage agreements force an adjustment in base prices.

### Steel Operations

. . . Industry rate hits 100 per cent of rated capacity

For the first time since 1929, the steel industry's average operating rate has hit 100 per cent of rated capacity. Present capacity, however, is about 15 per cent above that of 1929. The Gano Dunn report of steel capacity, recently published, estimated that an average rate of not less than  $102\frac{1}{2}$  per cent of rated capacity could be maintained over an extended period.

The estimate for this week does not take into calculation the possibility of reduction of output because of a strike at the Bethlehem, Pa., plant of Bethlehem Steel Co.

High rates have been attained in some districts, such as: St. Louis, 111 per cent; Southern Ohio, 107; Buffalo, 106; Pittsburgh, 101½.

### Iron Ore

... Early opening of navigation will increase movement

Lake Superior iron ore shipments will be increased as the result of the plan of the Michigan State Highway Commission, in response to a request by OPM Director General William S. Knudsen, to break open the ice-bound Soo Canal. The use of the ferry Sainte Marie as an ice breaker on the St. Mary's River and the Straits of Sault Sainte Marie will advance the ore movement by two weeks since it is proposed to begin the operations about April 1 whereas navigation on the Great Lakes generally is not open for ore shipments until the midle of April.

The largest April ore shipments from the Lake Superior region were made in 1937 when they aggregated 3,770,555 tons. While it is conceded that the calculation is not a safe one because of the uncertainty of weather and other factors, it has been roughly estimated that the advanced movement may increase shipments by 3,000,000 tons.

Gano Dunn placed 1941 iron ore requirements from the Great Lakes at 83,187,746 net tons out of a total of 98,853,978 tons for maximum reliable steelmaking capacity of 87,576,099 tons. Calculated on average conditions, Mr. Dunn fixed the Great Lakes transportation facilities at 84,000,000 tons. An additional 3,000,000 tons would bring this capacity to 87,000,000 tons and consequently increase the estimated Great Lakes surplus to 3,812,254 tons. It also has been pointed out that the advanced lake movement may likewise accelerate the shipment of scrap from the Upper Lake region.

### Pig Iron

. . Shortage definitely sighted in central districts

Information from the PITTS-BURGH, WHEELING and VALLEY districts indicates that a shortage of pig iron for merchant consumption is definitely in the making. Some large steel mills have been forced to pare down merchant iron shipments as well as drastically curtail the acceptance of new business. Merchant stacks are being flooded with pleas for material from a long list of merchant pig iron users who previously had other sources of supply. Merchant pig iron producers in the East and Middle West already have their hands full allocating pig iron grades among their regular customers.

If government subsidy is provided, some idle blast furnaces could be blown in. Without govern-

ment aid, they could not be operated profitably since in most instances a considerable amount of money would have to be expended to put them in condition for operation. Moreover, some of them are not economically located with respect to markets and supplies of raw materials.

After remaining at the old price level for the first quarter of the year, three of the largest iron producers in eastern Pennsylvania raised their prices for second quarter delivery \$1, although still quoting on the basis of price at time of shipment. Practically all available tonnage has been taken up, however, by previous commitment. One large producer recently purchased a moderate tonnage to help cover the needs of regular customers.

In the opinion of one of the large buyers at CLEVELAND, whose melt has risen sharply in recent months, merchant iron shipments are satisfactory. At the same time this user foresees the necessity for still more standardization over the remainder of this year in order to enable fullest blast furnace production.

BUFFALO producers are coping successfully with a record demand for iron. All consumers are being supplied with enough iron to satisfy their immediate needs, though this is drawing heavily on reserve supplies. The demand for silvery iron has increased noticeably at BUFFALO.

### Semi-Finished Steel

... Current demand far outruns production

Current demand is far outrunning both shipments and production. The amount of business being booked is by no means indicative of the volume of inquiries since many of the latter are going unsatisfied. It is believed, however, that inquiries are in somewhat greater volume than actual needs, a condition which is representative of the present-day "anxiety neurosis."

### Warehouse Business

... Survey being made of stocks and order volume

Steel warehouses, confronted with unprecedented demand which forces them to seek heavier allocations from the mills, are cooperating in a survey of their recent order volume. The data will be available for Washington and for the steel industry's defense committee.

The task of the warehouses has been intensified by emergency demands vital to the defense program. The machine tool industry in particular relies heavily on warehouses. Buyers from far off cities have been touring far afield in an effort to round up all the material available in certain specific sizes and analyses.

### Reinforcing Steel

... Awards 9700 tons ... New jobs 7625 tons

Reinforcing steel awards of 9700 tons include 2000 tons for the Mare Island Navy Yard, and 1650 tons for an airplane parts plant at Chicago for the Buick Motor Division of General Motors Corp. New projects call for 7625 tons. The largest inquiries are 2000 tons at Philadelphia for a dry dock at the Navy Yard; 1500 tons in Macomb County, Mich., for the Hudson Motor Co.'s ordnance plant, and 1200 tons at Wireton, Pa., for the Duquesne Light Co.'s power plant.

### Bolts, Nuts and Rivets

... Makers having difficulty in getting special steels

Like other industries, bolt and nut makers at CLEVELAND are encountering occasional difficulty in readily obtaining special steels, particularly analyses involving nickel or zinc. Buying continues to be very brisk. Large orders for defense program are coming out regularly and the past week was no exception.

### Railroad Buying

... 4620 freight and 70 passenger cars ordered

This week's outstanding purchases are 4620 freight cars and 70 passenger cars.

Southern Pacific's purchase of 2500 freight cars has been completed. Mt. Vernon Car Mfg. Co. is to supply 500 auto box cars, and General American Transportation Corp., Pressed Steel Car Co. and Bethlehem 500 box cars each. The order for 500 cars placed with

Pullman-Standard was reported in THE IRON AGE last week. Approximately 25,000 tons of steel will be used for these cars.

Baltimore & Ohio has allocated 1000 hopper cars to General American Transportation Corp., 250 box cars to Pullman-Standard, 150 covered hopper cars to Greenville Steel Car Corp. and it will probably build 100 cabooses in own shops. These 1500 freight cars will consume approximately 17,000 tons of steel.

Chesapeake & Ohio has distributed orders for 1000 50-ton allsteel hoppers as follows: 400 to American Car & Foundry Co., 300 to Pullman-Standard, 300 to General American Transportation.

Western Maryland has bought 40 covered hopper cars of 70-ton capacity from American Car & Foundry and the Phelps-Dodge Corp. took 80 air-dump cars of 90-ton capacity from the Differential Steel Car Co.

Union Pacific has placed an order with Pullman-Standard Car Mfg. Co. for a total of 70 lightweight passenger, mail and baggage cars.

Inquiries for passenger rolling stock include one for 21 passenger motor coaches from the South African Railways, and some for a total of 15 units from Kansas City Southern, Chicago, Indianapolis & Louisville and Illinois Central.

The Navy has ordered three 300-hp. diesel-electric switching locomotives from the H. K. Porter Co. and is inquiring for two 50-ton diesel engines for the Boston Navy Yard. Other inquiries for some 10 to 15 small units come from New York, Ontario & Western, Norfolk & Western and Lehigh Valley.

### Merchant Bars

. . . Demand continues at a record-breaking pace

Equitable distribution of available hot rolled bar capacity remains one of the toughest problems in the bar industry, according to PITTS-BURGH reports. Incoming business has shown no signs of slowing up, armament requirements are increasing, and the demand for supplies from cold rollers is growing. A slackening in demand from automotive centers would help out considerably but so far no signs ap-

pear that this will happen. Specifications for cold finished bars for British consumption are on the increase and sales from warehouses have reached an all-time high. Cold finished bar distributers are not able to replenish supplies as fast as they are moving out.

On top of the record order backlogs held by bar mills at CLEVE-LAND and YOUNGSTOWN, additional heavy orders for small bars for small arms plants are imminent. Production continues at the highest sustained pace ever attained.

CHICAGO demands for carbon and alloy bars is still heavier than that for any other product.

#### Wire Products

. . . Sales ahead of February, a high month

Having established a new high in February, wire sales at PITTS-BURGH so far this month are running ahead of that period. The increases cover rods, manufacturers wire, and merchant business.

Continued heavy demand for all principal items in the manufacturers and merchants division is reported by wire mill operators at CLEVELAND, while rod requirements are described as being overwhelming. Awards in connection with the national defense program are mounting week by week. This is particularly true in regard to electric cable.

### Sheets and Strip

... Output may be restricted by larger plate rollings

Already faced with an avalanche of specifications which have set deliveries back to the fourth quarter, sheet and strip makers believe they and their customers will soon have a new problem to contend with—the possible allocation of some continuous mill capacity for the manufacture of ship plates. This move is already being discussed in important steel and Washington circles and whether or not such action would be covered by preference ratings or priorities is immaterial, since there is little difference so far as mill schedules are concerned. A major factor to bring this question to a head is the foregone conclusion that at least 300 more "ugly duckling" ships in addition to the 200 already placed, will be ordered soon.

There is apprehension among automobile companies, that diversion of continuous sheet-strip mills to larger production of plates will affect shipments of sheets and strip to them. The auto makers have very large orders for these products on mill books.

Strip requirements for the defense program are becoming heavier, according to CLEVELAND sellers. Several large inquiries for cold strip for bomb racks are pending and some mills are finding it difficult to offer delivery anywhere near the date desired by prospective buyers. One Ohio producer of sheets last week was setting up schedules for October rollings.

CHICAGO mills find sheet business going mostly to automotive and defense purchasers. Auto specifications have not slackened. Government inquiries and orders are increasing. One mill has stopped production of its corronized zinc alloy sheets.

Sales of galvanized sheets are being generally restricted owing to zinc shortage.

### Structural Steel

... Awards 17,400 tons ... New projects 34,525 tons

Fabricated structural steel awards of 17,400 tons compare with 25,100 tons last week. The largest lettings are 2000 tons at BUFFALO, for the Huntley station of the Buffalo-Niagara Electric Corp; 1800 tons for a General Electric plant unit at Pittsfield, Mass.; 1100 tons for Public School No. 25, Brooklyn; 1000 tons at Homestead, Pa., for a building for the Mesta Machine Co.; and 1000 tons for an aeronautical materials storehouse for the Navy Department at Oakland, Cal.

New projects total 34,525 tons. Sizable new jobs are 12,000 tons at St. Louis for a munitions plant for the Western Cartridge Co.; 5000 tons at Cleveland for the Chase Brass & Copper Co.; 4800 tons at Gravelly Point, Va., for government hangars and shops; 4000 tons at Indianapolis for a Bridgeport Brass Co.'s plant; 1500 tons for truss and girder spans for the Northern Pacific railway in the state of Washington, and 1300 tons for a turbine diaphragm building

for the General Electric Co. at Schenectady, N. Y.

#### Plates

... Speeding up of shipbuilding creates fresh delivery problem

Plate deliveries, already hampered by previous shipbuilding programs as well as other national defense requirements, are facing fresh hurdles due to the unprecedented speed demanded for the completion of 200 merchant ships. The plate situation has reached a point where steel officials, OPM executives and Navy officers are seeking a solution, which might include the earmarking of some high speed continuous mill capacity for the production of plates over and above the tonnage now being produced in this manner. Especially is this true in view of an impending order for an additional 300 "ugly duckling" ships.

### Tubular Goods

... Navy places million dollar order for special pipe

Awards to Ohio mills involving tubular goods for national defense program were particularly heavy last week and were reported to include a \$1,093,000 purchase by the Navy for special pipe and couplings from Youngstown Sheet & Tube Co. Cold drawn seamless tubing and electric weld pipe are in very great demand. One small user in the CLEVELAND district of the former type reports promises received recently range around 25 weeks.

### Shipbuilding

... Programs to be expanded ... Awards of 200 ships being made

The program to construct 200 standardized steel cargo ships, in addition to 60 ships of the same design ordered by Great Britain, will be further expanded.

This was indicated by OPM Director General William S. Knudsen at a press conference last week after the Maritime Commission announced it had awarded the first of seven contracts—a \$37,500,000 contract to the North Carolina Shipbuilding Co., of Wilmington, N. C.—under the 200-ship construction project. This contract calls for the construction of 25 steel cargo ships

expected to require about 75,000 tons of steel. The steel requirements of the 200 ships have been estimated at 600,000 tons.

Preliminary work on the ships has gone forward for the last two months in Wilmington, where a sixway yard to cost \$5,140,000 is under construction. The company is an affiliate of the Newport News Shipbuilding & Dry Dock Co.

The Maritime Commission on Tuesday awarded contracts totaling \$205,500,000 for 137 steel cargo ships of the standardized design under the 200-ship program. The ships will require approximately 420,000 tons of steel. The contracts which leave all but 38 of the 200 ships contracted for, were awarded to these companies:

Bethlehem-Fairfield Shipyard, Inc., Baltimore, 50 ships to cost \$75,000,000.

Oregon Shipbuilding Co., Portland, Ore., 31 ships to cost \$46,500,-000

California Shipbuilding Co., Los Angeles, 31 ships to cost \$46,500,-000.

Houston Shipbuilding Co., Houston, Tex., 25 ships to cost \$37,-500,000.

A contract for construction of two new ore freighters, the largest ever to be built on the Great Lakes, has been awarded to the Great Lakes Engineering Works, River Rouge, Mich., according to A. H. Ferbert, president of Pittsburgh Steamship Co., subsidiary of U. S. Steel Corp. Each vessel will be 640 ft. long overall and will carry 17,500 gross tons at a maximum.

### Tin Plate

... Cold reduced operations are at 97%

Cold reduced tin plate operations are estimated this week at 97 per cent of capacity, up one point from last week. Fresh order demand remains at top levels.

At CHICAGO one mill is out of the market and another is running its modern mills at more than 100 per cent

### Coke

. . . 100 beehive ovens in Birmingham district to be started

Republic Steel Corp. has started work of rehabilitating 100 beehive coke ovens at the company's Virginia coal mines near Birmingham.

# Machine Tools

### . . . SALES, INQUIRIES AND MARKET NEWS

#### Shell Plants Soon to Need Many Tools

Cleveland

• • • The recent distribution of formal contracts for machine tools by such large buyers as Cleveland Pneumatic Tool Co. and Eaton Mfg. Co. has made March an outstanding month for dealers here. The market soon can be expected to enter a new phase, centering around equipment needed for the production of ammunition. With the large government plants being erected at Ravenna and Huron, the northern Ohio area will be called upon for high output of shells.

At least a half dozen companies are in line for shell contracts and will require much machinery, quite a bit of it being special. Large amounts of money will be spent. In the meantime there are a number of other active projects such as the Fostoria gas mask plant, Mitchell Metal Products and other projects which are creating a liberal flow of business.

#### Cincinnati Tool Plants Subcontracting Much Work

Cincinnati

• • • Every effort is being devoted by district machine tool plants toward increasing production. Virtually every manufacturer in the market, with one or two exceptions, is subcontracting substantial proportions of its work wherever available idle machine capacity is found, and they continue to look for more of such opportunities. Operations within their own plants are crowding present facilities and steady pressure to complete plant additions is being made. Output is definitely 50 per cent over last year and, as new plants are completed, this production rate will increase.

#### Westinghouse Tool Forum To Discuss Defense Production

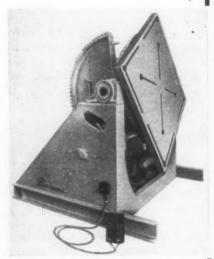
• • • Principal feature of the 1941 Machine Tool Electrification Forum, to be held April 14-15-16 at the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will be the discussion of production and design problems created by the national defense emergency in the machine tool industry. Howard Dunbar, vice president, Norton Co., and at present a member of the Machine Tool Division of the National Defense Advisory Commission will outline the production problems of national defense and the responsibilities of the machine tool industry. Design and electrical apparatus considerations for heavy duty gun boring lathes will be discussed by G. A. Spohn, electrical engineer of the General Machinery Corp. J. R. Weaver, manager of the Louisville Ordnance division of the Westinghouse Electric & Mfg. Co., will speak on Westinghouse activities in national defense. R. H. Clark, electrical engineer for Warner & Swasey will describe prefabricated wiring methods for machine tools, and Philip McKenna, president of McKenna Metals Co., will discuss metal cutting carbide tools.

#### Packaging Research Book Issued

• • • • A new book, "How Research Can Save Dollars for You," has just been announced by the General Box Co., Chicago. The book points out how packaging research can save valuable man-hours for the shipper—an important factor as the demand for more and more speed is put upon industry. Several pages are devoted to the new General cleated corrugated containers. This container is classified as a crate but is closed on all faces.

# From an actual case record ... "42% saved in labor costs"

TODAY, when increased production is the watchword, laborsaving tools assume greater importance.
Such a tool is the



### Ransome. Welding Positioner

Case studies reveal labor savings ranging from 25% to 50% and rod savings from 5% to 7%. Added features are reduced crane service and greater safety. Write for bulletin.

INDUSTRIAL DIVISION

RANSOME CONCRETE MACHINERY COMPANY
DUNELLEN, N. J.

# Non-Ferrous Metals

New York, March 25-A longawaited step to bring regulation into the disorderly tributary aluminum markets was taken in the past week when the government officially fixed maximum prices for the sale of scrap and remelt aluminum. The announcement was accompanied by a warning that the schedule would be fully enforced. A similar schedule for secondary and scrap zinc will probably be set up shortly. The American Brass Co. announced in the week that it was discontinuing the production of its No. 67 brass pipe due to the shortage of zinc. Demand was good in all major non-ferrous markets in the past week, the only price change being a slight rise in tin.

While the allocation committee was engaged in the allotment of Latin-American copper, delivery of which will begin in April, mine producers satisfied as much demand as possible by the distribution of available domestic supplies at 12c. a lb., delivered Connecticut Valley. Inquiry was more or less moderate throughout the week in the custom smelter market with fair tonnages for March delivery going at 12.50c. The export market continues more or less nominal and quoted at around 10.60c. f.a.s.

#### Lead

Stocks of refined lead declined only 644 tons to 46,604 tons at the end of February, monthly statistics showed. A fall in total production of 7817 tons, or about 13 per cent, was accounted for mainly by the shorter month, although there was a slight decrease on a daily basis. Shipments were 9 per cent higher on a daily basis, averaging 1959 tons in February, compared with 1797 tons in the previous month. Consuming demand in the past week was in very good volume with waiting lists reappearing in one or two instances. Since April needs are now 75 per cent accounted for and carload lots for immediate use are moving promptly. However, a good part of the present ordering seems to be in the way of a provision for eventualities. Prices are firm at 5.75c. a lb., delivered New York.

#### Zinc

Sales in the past week totaled 1967 tons, up slightly from the previous week's total of 1577 tons, but still falling far short of the demand. All but a small part of the tonnage was sold at the flat price of 7.64c. a lb., delivered New York, unchanged since last September. Shipments held up fairly well, being 5050 tons, compared with 1524 tons two weeks ago, while unfilled orders declined from 99,392 to 96,289 tons in the period. Following the recent announcement of maximum prices on scrap and secondary aluminum, a similar statement regarding scrap zinc prices is expected momentarily.

#### Tin

Principally because of restricted supplies, the price of prompt Straits metal rose further in the past week, touching 52.75c. a lb., delivered New York, on Thursday. Following a recession in the Far Eastern market, however, it dropped back to 52.50c., compared with 52.25c. a week ago. Buying was relatively steady but in moderate volume throughout the week. The Navy Department announced that it will come into the market April 3 for 1,000,000 lb., one-third to be delivered in 30 days, one-third in 60 days, and the balance in 90 days. In view of the limited condition of nearby supplies, sellers are wondering whether there will be enough tin left after this order is filled to meet ordinary demand.

(Non-ferrous prices on page 135)



# Scrap. .. MARKET ACTIVITIES AND QUOTATION TRENDS

The price stabilization division. National Defense Commission, has met with representatives of the scrap trade and will meet this week with representatives of the steel industry relative to price differentials to be announced shortly. Present indication is that the differentials will be announced late this week or early next week. In addition to fixing ceiling prices for various grades of scrap sold for domestic consumption, the price stabilization division will also exercise control over export prices. Prices will also be fixed on various grades sold by the railroads. The method of price control will be similar to that announced for scrap and remelt aluminum, details of which will be found on another page of this issue.

Pending the announcement of fixed prices, steel grades in virtually all markets are unchanged this week, but cast grades have been advancing because of scarcity of such material and scarcity of pig iron. A Pittsburgh mill has bought about 30,000 tons of No. 1 and No. 2 steel scrap which will be moved by barge from New Orleans and Houston.

THE IRON AGE scrap composite is unchanged at \$20.33 for the third consecutive week.

#### Pittsburgh

The leading steel producer in this district within the past week purchased between 30,000 and 35,000 tons of scrap involving No. 1 and No. 2 heavy melting grades. The material, some of which was yard scrap and some of which was on docks for export purposes, is being shipped into this district from New Orleans, La., and Houston, Tex. It is be-lieved the delivered price at Pittsburgh will come within the figures of \$21 for No. 1 and \$20 for No. 2. It is further believed that the steel company will utilize its own transportation facilities. Aside from this apparently non-recurring scrap transaction, activity here is practically stymied and awaits official government action on price fixing. Some inbelieve the fixing of formed sources prices is only one of the hurdles to be encountered in starting a normal flow of scrap to steel mills in this district.

#### Chicago

Waiting for formal issuance from Washington of scrap differentials, expected any day, the market here remained quiet and prices failed to move

in any direction. A committee of the Chicago chapter of the Institute of Scrap Iron and Steel telegraphed the price stabilization Division last week that Chicago's suggestion for differentials would be \$1 below Pittsburgh on open hearth and blast furnace grades and that cast grades should be adjusted on a percentage basis related to pig iron prices. The committee pointed out in its wire that spreads in some items as published by THE IRON AGE about five or six months ago were influenced by an overabundance of material at that time. This overabundance does not exist today and therefore the spread should be narrower, was the committee's belief. Reference to THE Iron Age quotations was made because these prices were used as the basis for the government's study of scrap prices.

#### Philadelphia

Steel scrap is not flowing to the steel mills of this district at a rate as fast as it is being consumed. Scrap stocks at mills have not reached a critical low point, but unless the scrap flow becomes greater, the time will come when a definite shortage will exist. Cast scrap is in a critical phase. Prices are higher this week. Heavy breakable cast and iron carwheels are quoted at \$24, No. 1 machinery cast at \$26 and mixed yard cast at \$23.50. For prime cupola grades one foundry is reported to have paid as high as \$28.

#### Youngstown

Hesitation caused by the lack of an announcement from Washington on differentials has been apparent here during the past week. There has been some quiet activity but for the most part within current printed price ranges which are unchanged this week.

#### Cleveland

The delay in bringing out the expected differentials has put a damper on business here during the past week. Dealers don't want to buy or sell until the price situation is clarified by Washington.

#### Buffalo

Scrap in the Buffalo district is not coming out fast enough to meet demands. There are reports here that an attempt is being made to secure the same base as Pittsburgh when set differentials go into effect. Failing this, brokers want a \$21 Pittsburgh base, which would put No. 1 heavy melting steel at \$20.33 a ton here. The shortage of cast scrap is becoming acute, dealers report.

#### St. Louis

The scrap iron market in St. Louis was generally unchanged, with no action on melting steel grades pending settlement of the proposed differential plan, several thousand tons of specialties were sold during the week. Cast grades are especially tight.

#### Cincinnati

The artificiality of the scrap market makes it difficult to appraise prices. Dealers report that they can sell almost any kind of scrap but the imminence of government control contributes uncertainties to the market. More material is coming into the market, although dealers are unable to ascertain whether this is coming in through fright or through attractiveness of present quotations. Movement on contract also continues aggressive.

#### Birmingham

Movement of cast grades into this district has shown a slight decline. Other items are coming in steadily but not in sufficient quantities to permit large accumulations. Foundries are taking about everything available.

#### Detroit

A high degree of uncertainty pervades the Detroit scrap market. Brokers and dealers, however, report that they still doing business at the price level that has prevailed for the past two or three weeks on most items. Yard scrap is not available in large quantities and is not moving freely, although brokers have been able to get most of what they need to complete normal transactions with consumers. Plant scrap in some instances has decreased in quantity, it is reported. Pricewise the only exception is in foundry grades where steady upward pressure has been apparent. An outstate buyer is reported reliably to be paying \$22 a gross tor for automotive cast.

#### New York

Following last week's price increases in cast grades delivered barges, the market has now advanced and cast grades are currently quoted 50c. to \$1 higher. It is pointed out, however, that cast can bring almost any price and that these quotations are approximations at best. At a recent sale by the Board of Transportation, 400 tons of used rails on the ground brought \$23.01 a ton and 130 tons of steel wheels \$22.05.

#### Boston

The slowness of such materials as steel turnings, stove plate, chemical borings, shafting and breakable cast to come into the market, coupled with a somewhat keener demand, has raised prices 25c. to 50c. a ton, and quotations on unprepared yard steel are firmer. For eastern Pennsylvania delivery, No. 1 steel is moving in small lots at around \$14.65 a ton on cars, and for Pittsburgh district at around \$15.15 a ton on cars, these prices representing little or no change. New England foundries are taking textile and machinery cast freely.

PITTSBUKGH						
Per	gross	ton	delivered	to cor	sus	ner:
			ng. steel			
			y mltng.			
			elting			
Railro	ad s	crap	rails	22.00	to	22.5
			under		to	27.0

#### PHILADEL PHIA

FILLENDELFILLY	
Per gross ton delivered to consur	ner:
No. 1 hvy. mltng. steel	\$20.00
No. 2 hvy. mltng, steel	19.00
Hydraulic bund., new	20.00
Hydraulic bund., old \$17.50 to	18.00
Steel rails for rolling	23.50
Cast iron carwheels	24.00
Hvy. breakable cast	24.00
No. 1 cupola cast 25.50 to	26.00
Mixed yard (f'd'y) cast	24.50
Stove plate (steel wks.)	21.00
Railroad malleable 23.50 to	24.00
Machine shop turn 15.00 to	15.50
No. 1 blast furnace 14.50 to	15.00
Cast borings 17.00 to	17.50
Heavy axle turnings 19.50 to	20.00
No. 1 low phos. hvy 26.50 to	27.00
Couplers & knuckles 26.50 to	27.00
Rolled steel wheels 26.50 to	27.00
Steel axles 25.00 to	25.50
Shafting 25.00 to	25.50
Spec. iron & steel pipe 18,00 to	18.50
Cast borings (chem.) 17.50 to	

#### CHICAGO

Delivered to Chicago distr		
	Per Gro	ss Ton
Hvy. mltng. steel		\$20.00
Auto. hvy. mltng, steel		
alloy free	\$18.50 to	19.00
No. 2 auto, steel	16.50 to	17.00
Shoveling steel	19.50 to	20.00
Factory hundles	19.00 to	19.50
Factory bundles Dealers' bundles	18.00 to	
No. 1 busheling	18.50 to	
No. 2 busheling, old	10.50 to	
Rolled carwheels	22.50 to	
Railroad tires, cut	23.00 to	23.50
Railroad leaf springs	22.50 to	
Steel coup. & knuckles	22.50 to	
Axle turnings	18.75 to	
Coil applage		
Coil springs	24.00 to	
Axle turn. (elec.)	19.75 to	
Low phos. punchings	23.00 to	23.50
Low phos. plates 12 in.		
and under	23.25 to	23.75
Cast iron borings	15.50 to	
Short shov. turn	15.50 to	
Machine shop turn	13.75 to	
Rerolling rails	24.00 to	
Steel rails under 3 ft	23.50 to	
Steel rails under 2 ft	24.50 to	
Angle bars steel	23.00 to	
Cast iron carwheels	20.00 to	20.50
Railroad malleable	24.50 to	25.00
Agric. malleable	17.50 to	18.00
		let Ton
fron car axles	\$23.50 to	
Steel car axles	25.50 to	26.00
Locomotive tires	18.00 to	18.50
Pipes and flues	14.00 to	14.50
No. 1 machinery cast	21.00 to	21.50
Clean auto. blocks	19.50 to	20.00
No. 1 railroad cast	17.75 to	18.25
No. 1 agric. cast	16.50 to	
Stove plate	14.50 to	
Grate bars	14 00 to	
Brake shoes	15.00 to	
	20100 0	10.00

#### YOUNGSTOWN

Per gross	Per gross ton delivered to con				ner:
No. 1 hvy. 1	nltng.	steel.	\$20.50	to	\$21,50
No. 2 hvy.					
Low phos I					
No. 1 bushe	eling .		20.00	to	20.50
Hydraulic 1	oundle	8	20.25	to	21.25
Machine sh	op tur	n	15.50	to	16.00

#### CLEVELAND

Per gross ton delivered to consumer: No. 1 hvy. mltng. steel\$20.00 to \$21.00 No. 2 hvy. mltng. steel. 19.00 to 20.00

Comp. sheet steel		
Light bund, stampings	15.00 to	15.50
Drop forge flashings	19,00 to	19.50
Machine shop turn	13.50 to	14.00
Short shov, turn	16.25 to	16.75
No. 1 busheling	19.25 to	19.75
Steel axle turnings	19.50 to	20.00
Low phos. billet and	10.00 00	20.00
bloom crops	24.50 to	25.00
Cast iron borings	16.25 to	16.75
Mixed bor. & turn	16.25 to	16.75
No. 2 busheling*	15.00 to	15.50
No. 1 machinery cast.	24.00 to	24.50
Railroad cast	23,50 to	24.00
Railroad grate bars	15.00 to	15.50
Stove plate	15.00 to	15.50
Short rails, 2 ft. length	26.75 to	27.25
Rails for rolling	25.50 to	26.00
Railroad malleable	24.50 to	25.00

#### BULLEALO

DUFFALO						
Per gross ton delivered	Per gross ton delivered to consumer:					
No. 1 hvy. mltng. steel.	\$21.00 to	\$21.50				
No. 2 hvy. mltng. steel.	19.00 to	19.50				
Scrap rails	22.00 to	22,50				
New hvy, b'ndled sheets	19.00 to					
Old hydraul, bundles	17.50 to	18.00				
Drop forge flashings	19.00 to	19.50				
No. 1 busheling	19.00 to	19.50				
Machine shop turn	13.50 to	14.00				
Shov, turnings	16.00 to	16.50				
Mixed bor. & turn	14.50 to	15.00				
Cast iron borings	14.50 to	15.00				
Knuckles & couplers	25.00 to	25.50				
Coil & leaf springs	25.00 to	25.50				
Rolled steel wheels	25.00 to	25.50				
No. 1 machinery cast	22.50 to	23.00				
No. 1 cupola cast	21.00 to	21.50				
Stove plate	18.00 to	18.50				
Steel rails under 3 ft	27.00 to	27.50				
Cast iron carwheels	21.50 to	22.50				
Railroad malleable	24.00 to	24.50				
Low phos. plate	26.50 to	27.00				

#### ST. LOUIS

011 - 0 - 10					
Dealers	buying	prices	per	gross	ton
	delivered				
Selected	hvv m	alting	\$18	00 to	\$18.

Selected hvy. melting.	18.00 to	\$18.50
No. 1 hvy. melting	17.50 to	18.00
No. 2 hvy. melting	16.50 to	17.00
No. 1 locomotive tires	20.00 to	
Misc. stand. sec. rails	20.00 to	20.50
Railroad springs	22.00 to	
Bundled sheets	13.00 to	
Cast bor. & turn	10.50 to	
Machine shop turn	11.00 to	
Heavy turnings	14.50 to	
Rails for rerolling	21.50 to	
Steel car axles	25.50 to	
No. 1 RR wrought	14.25 to	
No. 2 RR. wrought	16.50 to	
Steel rails under 3 ft	24.00 to	
Steel angle bars	21.50 to	
Cast iron carwheels	21.50 to	
No. 1 machinery cast	20.00 to	
Railroad malleable	20.50 to	
Breakable cast		
Stove plate		
Grate bars		
Brake shoes	14.50 to	15.0

#### CINCINNATI

#### Dealers' bu

Dealers Duying Prices I	see Br	000	C CLRT
at yards:			
No. 1 hvy. mltng. steel.	18.25	to	\$18.75
No. 2 hvy. mltng. steel.			
Scrap rails for mltng.	23.25		
Loose sheet clippings.	12.75	to	13.25
Hyd'lic bundled sheets	17.00	to	17.50
Cast iron borings	9.25	to	9.75
Machine shop turn	10.00	to	10.50
No. 1 busheling	14.25	to	14.75
No. 2 busheling	7.75		8,25
Rails for rolling	24.50	to	
No. 1 locomotive tires.	20.25		20.75
Short rails	26.25		
Cast iron carwheels	18.75		
No. 1 machinery cast	22.25		
No. 1 railroad cast	20.50		
Burnt cast	12.75		
Stove plate	12.75		
Agricul, malleable	18.00		
Railroad malleable	21.00		
Mixed hvy. cast	19.25		
manage arry better arra	20.00		20.00

#### BIRMINGHAM

Per gross ton delivered to	10	nsumer:
No. 1 hvy, melting steel .		. \$13.00
No. 2 hvy. melting steel .		. 17.00
		. 16.00
Scrap steel rails		. 18.0
Steel rails under 3 ft		. 20.00
Rails for rolling		. 20.00
		. 9.5
74.		. 13.5
		. 18.0
No. 1 RR. wrought		. 16.0
No. 1 cast		. 19.5
		. 14.5
Cast iron carwheels		. 19.0
Steel carwheels		. 18.0

#### DETROIT

#### Dealers' buying prices per gross ton,

1.0.D. cars:		
No. 1 heavy melting	\$16.50 to	\$17.00
No. 2 heavy melting	15.50 to	16.00
Borings and turnings.	12.50 to	13.00
Machine shop turnings.	11.50 to	12.00
Long turnings	10.00 to	10.50
Short shov, turnings	13.00 to	13.50
No. 1 cast	20.00 to	21.50
Automotive cast	21.50 to	22.00
Hvy. breakable cast	18.50 to	19.00
Stove plate	13.00 to	13.50
Hydraul, comp. sheets.	17.75 to	18.25
New busheling	16.50 to	17.00
Sheet clips	13.75 to	14.25
Flashings	16.50 to	17.00
Low phos. plate	19.00 to	19.50

#### NEW YORK

#### Dealers' buying prices per gross ton

on cars:	
No. 1 hvy. mltng. steel	\$16.50
No. 2 hvy. mltng. steel\$15.00 to	15.50
Hvv. breakable cast 19.00 to	19.50
No. 1 machinery cast. 19.50 to	20.00
No. 2 cast 18.50 to	19.00
Stove plate 17.00 to	17.50
Steel car axles 23.50 to	24.00
Shafting 20.00 to	
No. 1 RR wrought 17.50 to	18.00
No. 1 wrought long 17.00 to	17.50
Spec. iron & steel pipe 13.00 to	13.50
Rails for rolling 19.50 to	
Clean steel turnings*. 10.00 to	
Cast borings* 11.00 to	11.50
No. 1 blast furnace 10.00 to	10.50
Cast borings (chem.) 11.00 to	11.50
Unprepared yard scrap 9.50 to	10.00
Light iron 7.00 to	
Per gross ton delivered local fou	ndries:
No. 1 machin. cast\$21.00 to	\$23.00
No. 2 cast 18.50 to	19.00

\* \$1.50 less for truck loads,

#### BOSTON

#### Dealers' buying prices per gross ton,

f.o.b. cars:	
Breakable cast\$17.50 to	\$17.75
Machine shop turn 10.00 to	10.25
Mixed bor. & turn 9.25 to	9.75
Bun, skeleton long 13.25 to	13.50
Shafting 19.50 to	20.00
Stove plate 14.75 to	15.00
Cast bor. chemical 11.25 to	11.50
Per gross ton delivered consumers'	
Textile cast\$22.00 to	\$24.50
No. 1 machine cast 22.00 to	24.00

#### Per gross ton delivered dealers' yards: Unprepared yard scrap.\$11.25 to \$12.50 PACIFIC COAST

#### Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel .\$18.5	50 to \$19.00	Nom.	\$15,00
No. 2 hvy. mltng. steel . 17.5		Nom.	14.00

#### CANADA

#### Dealers' having prices at these vards.

Dealers buying prices at		our crack
per gross ton:		
Toro	nto M	ontreal
Low phos. steel	14.00	\$13.50
Specialty steel	15.00	14.50
No. 1 heavy mltng, steel		12.00
No. 2 heavy mltng steel		10.00
Mixed dealers' steel	9.50	9.00
Drop forge flashings	10.50	10.00
New loose clippings	8.75	8.25
Busheling	7.50	7.00
Scrap pipe	8.75	8.25
Steel turnings	9.00	8.50
Cast borings	9.00	8.50
Machinery cast	24.75	24.00
Dealers' cast	22,50	22.00
Stove plate	19.50	19.0

#### EXPORT

	EAFORI		
	uying prices		
New York,	truck lots,	delivered	barges
No. 1 hvy.	mltng, stee	el	\$16.50
No. 2 hvy.	mltng. stee	1	15.50
			19.00
Stove plate	*********		17.50

#### Boston on cars at Army Base

			or Mysi	ic Who	rf	
No.	1	hvy.	mltng.	steel.		\$17.25
No.	2	hvy.	mltng.	steel		15.75
Rail	1	(sera	n)	9	17 95 to	17 50

<sup>\*</sup>Due to a printer's error No. 2: busheling at Cleveland was quoted last week at \$23.50 to \$24.00; it should have read \$15.00 to \$15.50.

# Construction Steel

### ... STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

### Fabricated Steel

Lettings again lower at 17,400 tons against 25,100 tons last week; new projects advanced to 34,525 tons from 28,725 tons; plate awards only 200 tons.

#### AWARDS

#### NORTH ATLANTIC STATES

- 2000 Tons, Buffalo, Huntley station of Buffalo-Niagara Electric Corp., to Bethlehem Steel Co., Bethlehem, Pa.
- 1800 Tons, Pittsfield, Mass., General Electric unit, to American Bridge Co., Pitts-burgh.
- 1100 Tons, Brooklyn, public school No. 25, Lafayette Avenue, to Lehigh Structural Steel Co., Allentown, Pa.; Caristo Con-struction Co., contractor.
- 1000 Tons, Homestead, Pa., Barbette building for Mesta Machine Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 900 Tons, South Boston, two dry dock buildings, to American Bridge Co., Pittsburgh, through Sawyer Construction Co., Boston, contractor.

  775 Tons, Brooklyn, inspection shaft for Board of Transportation, to Harris Structural
- Brooklyn, inspection shaft for Board of Transportation, to Harris Structural Steel Co., Plainfield, N. J.; Thomas J. Waters, contractor.
  Tons, Loop, Pa., bridge No. 238.89 for Baltimore & Ohio Railroad Co., to American Bridge Co., Pittsburgh
  Tons, Sawaren, N. J., State bridge No. 18/36, to American Bridge Co., Pittsburgh
  Tons, Nawaren, N. J., State bridge No. 18/36, to American Bridge Co., Pittsburgh

- 360 Tons, New Haven, Conn., gluing building for National Folding Box Co., to American Bridge Co., Pittsburgh.
- Tons, Wallingford, Conn., Chemical Construction Corp., building No. 5, to American Bridge Co., Pittsburgh. 360 Tons.
- 245 Tons, New York, hospital addition, Home for Aged and Infirm Hebrews, 105th Street, to Lehigh Structural Steel Co., Allentown, Pa.
- 150 Tons, Clifton, N. J., extension and alterations, steel erecting shop, for Magor Car Corp., to American Bridge Co., Pittsburgh.
- 150 Tons, Quincy, Mass., Fore River works pattern shop, to Bethlehem Steel Co., Bethlehem, Pa.; Temple & Crane, Inc., Boston, contractor.
- 135 Tons, Brooklyn, Havemeyer Street market, to Mansfield Iron Works, Brooklyn.

#### THE SOUTH

900 Tons, Charleston, W. Va., crane girders for Navy, to American Bridge Co., Pittsburgh.

- 630 Tons, State of Kentucky, bridge for Illinois Central Railroad, to Virginia Bridge Co., Roanoke, Va., through TVA.
- 600 Tons, Mobile, Ala., outfitting and ma-chine shop for Gulf Shipbuilding Corp., to Southern Steel Works Co., Birming-
- 300 Tons, Brownwood, Tex., Army Air Corps hangar, to J. B. Klein Iron & Foundry Co., Inc., Oklahoma City, Okla.

#### CENTRAL STATES

- 875 Tons, Bucyrus, Ohio, General Electric fluorescent lamp plant, to Ingalls Iron Works Co., Birmingham.
- 831 Tons, St. Paul, Minn., State viaduct, to Bethlehem Steel Co., Bethlehem, Pa. 400 Tons, Cleveland, building for Addresso-graph-Multigraph Co. in Euclid, to Pitts-burgh Bridge & Iron Co., Pittsburgh.
- 350 Tons, Cleveland, building No. 114 for Aluminum Co. of America, to Bethlehem Steel Co., Bethlehem, Pa.
- Tons, Stickney, Ill., sludge plant struc-tures for Chicago sanitary district, to American Bridge Co., Pittsburgh.
- 275 Tons, St. Louis, factory for Busch-Sulzer Brothers Diesel Engine Co., to Stupp Brothers Bridge & Iron Co., St. Louis, through Smith-Cooke Construction Co., St. Louis general contractor.
- 270 Tons, Wheatland, Ind., highway bridge, to Central States Bridge & Structural Co., Indianapolis.
- Tons, Canton, Ohio, addition to Onesta Hotel, to Bethlehem Steel Co., Bethlehem. 200 Tons
- 130 Tens, Cleveland, building for Hinde-Dauch Paper Co., to Klein Structural Steel Co., Bellevue, Ohio.
- 120 Tons, Dearborn, Mich., State bridge, to American Bridge Co., Pittsburgh.
- 110 Tons, Sebewaing, Mich., State bridge, to Fort Pitt Bridge Works Co., Pittsburgh.

#### WESTERN STATES

- 1000 Tons, Oakland, Cal., aeronautical materials storehouse for Navy Department, to American Bridge Co., Pittsburgh.
  106 Tons, Portland, Ore., Western Electric Co. warehouse and garage, to Willamette Iron & Steel Corp., Portland, through L. H. Hoffman, Portland, contractor.
  100 Tons Contractor.
- 100 Tons, Fort Lewis, Wash., boiler house, to Isaacson Iron Works, Seattle.

#### FENDING STRUCTURAL PROJECTS NORTH ATLANTIC STATES

- 1300 Tons, Schenectady, N. Y., turbine dia-phragm building for General Electric Co.
- Avon. Pa., State highway bridge LR-149.

- 650 Tons, McKeesport, Pa., warehouse for G. C. Murphy Co.; bids in.
  600 Tons, Camden, N. J., launchway gates, etc., for New York Shipbuilding Corp.
- 465 Tons, Point Judith and Little Compton, R. I., roof beams, etc., for U. S. Engineers Office.
- 450 Tons, Brooklyn, addition, new patients building for Methodist Hospital.
- 155 Tons, Harrison, N. J., addition to building No. 3 for Worthington Pump Co.
- 133 Tons, Morris County, N. J., highway bridge, route 6, section 21A; bids April 9.
- 120 Tons, New York, ROTC drill hall for College of City of New York.
  100 Tons, Buffalo, G.L.F. Mills, Inc., elevator.

#### THE SOUTH

- 4800 Tons, Gravelly Point, Va., hangars and shops for government.
  275 Tons, Daviess County, Ky., Panther Creek bridge for State.

#### CENTRAL STATES

- 12,000 Tons, St. Louis, munitions factory Western Cartridge Co.; bids taken by Fruco Construction Co., St. Louis, gen eral contractor.
- 5000 Tons, Cleveland, plant for Chase Brass & Copper Co.
- 4000 Tons, Indianapolis, Bridgeport Brass Co. plant; Stone & Webster Co., Boston. Stone
- 275 Tons, Sandusky, Ohio, 17 buildings for Plum Brook ordnance plant; bids in.
- 250 Tons, Frankenmuth, Mich., State high-way bridge.
- 225 Tons, Hoovers, Ind., bridge No. 1696 for Chesapeake & Ohio Railway Co.; bids in.
- 200 Tons, Sterling, N. D., State overhead crossing FAGH-282-B (2).
- 175 Tons, Escanaba, Mich., State bridge.
- 165 Tons, Cincinnati, Lincoln Court for Cincinnati Housing Authority.

#### WESTERN STATES

- 1500 Tons, State of Washington, truss and girder spans for Northern Pacific Rail-
- 575 Tons, Lothrop, Cal., bridge for Southern Pacific Co.
- 300 Tons, Hunters Point, Cal., dry dock crane for government.
- 100 Tons, Odair, Wash., switch structures for Grand Coulee power plant; Bethlehem Steel Co., Bethlehem, Pa., low bidder.

#### FABRICATED PLATES

#### AWARDS

200 Tons, Arlington, Mass., 24-in. pipe for Massachusetts water division, to a cen-tral Massachusetts bidder.

### Weekly Bookings of Construction Steel

Week Ended	Mar. 25.	Mar. 18,	Feb. 25,	Mar. 26,	Yearte	Date
	1941	1941	1941	1940	1941	1940
Fabricated structural steel awards	17,400	25.100	33,525	7,500	376,275	195,560
Fabricated plate awards	200	1,250	2,900	6,670	32,855	37,435
Steel sheet piling awards	230	100	1,200	380	5,445	8,670
Reinforcing bar awards	9,700	24,150	8,650	4,900	137,740	95,570
Total Letting of Construction Steel	27,530	50,600	46,275	19,450	552,315	337,235

#### PENDING PROJECTS

- 1000 Tons, Sandusky, Ohio, 24-in. water pipe for Plum Brook ordnance plant; bids March 28.
   450 Tons, Buffalo, G.L.F. Mills, Inc., elevator.

#### SHEET PILING AWARDS

230 Tons, Detroit, Detroit Edison Co., to Bethlehem Steel Co., Bethlehem, Pa.

#### PENDING PROJECTS

- 560 Tons, Los Angeles, for harbor commission (Specification 1010); bids in.
  100 Tons, Toledo, requirements of Gulf Oil Co.; bids in.

### Reinforcing Steel

Awards of 9,700 tons; 7,625 tons in new

#### AWARDS ATLANTIC STATES

- 700 Tons, New York, municipal asphalt plant, to Bethlehem Steel Co., Bethle-hem, Pa.; Stock Construction Corp., em, Pa.; Stock Co New York, contractor.
- 350 Tons, New Haven, Conn., hos Truscon Steel Co., New Haven. hospital, to
- Truscon Steel Co., New Haven.
  300 Tons, Elizabeth, N. J., Singer Mfg. Co.
  plant, to Bethlehem Steel Co., Bethlehem.
  Pa., through Austin Co.
  280 Tons, Washington, New York Avenue
  viaduct, Pennsylvania Railroad, to Bethlehem Steel Co., Bethlehem. Co.; James
  McGraw Co., contractor.
  200 Tons, Niagara Falls, N. Y., plant for
  E. I. duPont de Nemours & Co., to
  Truscon Steel Co.
- E. I. duPont de Truscon Steel Co.
- Tons, Garrettport, Pa., school, to Taylor-Davis Co., Philadelphia, through J. P. Hallahan. general contractor, Philadel-
- Brooklyn, poultry market, to Igoe hers, Newark: Lieb Construction Brothers, News Co., contractor.
- Brooklyn Navy Yard, to Igoe ers, Newark; J. G. White Engi-ing Co., contractor. neering
- 150 Tons, Washington, offices for Washington Gas Light Co., to an unnamed bidder; James Baird Co., contractor.

#### SOUTH AND CENTRAL

- 1650 Tons, Chicago, Buick Motor Co. aero parts factory, to Calumet Steel Co., Chicago; Thorgerson & Ericsson, contractor.
- Tons, Kohler, Wis., Kohler Co. foundry, to Worden-Allen Co., Milwaukee; Permanent Construction Co., contractor.
- 456 Tons, Celco, Va., buildings for Celanese Corp., to Truscon Steel Co., Youngstown.
- 200 Tons, Charleston, Ind., buildings for E.
  I. duPont de Nemours & Co., to Truscon
  Steel Co., Youngstown, through George
  F. Hazelwood, general contractor.
- 180 Tons, St. Paul, Minn., Reserve Street bridge, to Bethlehem Steel Co., Bethle-hem, Pa.; M. E. Souther, contractor.
- 100 Tons, Chicago, WPA project for Treasury Department, to Truscon Steel Co

#### WESTERN STATES

- 2006 Tons, Mare Island Navy Yard, to Trus-con Steel Co., Youngstown, through Heafey Moore Co. and Fredericksen & Watson, general contractors.
- 967 Tons, Tucumcari, N. M., Tucumcari project (Invitation 32,992-A), to Capitol Steel & Iron Co., Oklahoma City, Okla.
- Tons, Coram, Cal., Central Valley project (Invitation A-33,162-A), to Judson Steel Corp., San Francisco.
- 176 Tons, Portland, Ore., Western Electric Co. warehouse and garage, to Mercer Steel Co., Portland, through L. H. Hoff-man, Portland, contractor.

#### CANAL ZONE

350 Tons, Panama Canal, Howard Field air base improvements, to Bethlehem Steel Co., Bethlehem, Pa.; N. P. Severin Co.,

#### PENDING REINFORCING BAR PROJECTS ATLANTIC STATES

- 2000 Tons, Philadelphia, Navy Yard drydock.
- 1200 Tons, Wireton, Pa., Duquesne Light Co. power station.
- 965 Tons, Buffalo, G. L. F. Mills Inc., elevator; bids in.
- 400 Tons, Queens, N. Y., contract QAG-5525, Department of Parks, Queens; Laurence J. Rice, New York, low bidder.
- 400 Tons, McKeesport, Pa., G. C. Murphy Co. warehouse; bids in.
- 245 Tons, Middlesex County, N. J., highway bridge, route 4, section 1B; bids April 9.
- 214 Tons, Morris County, highway bridge, route 6, section 21A; bids April 9. 113 Tons, Lebanon County, Pa., bridge, R-149, section 1.
- 149, section 1.
  100 Tons, Newington-Pomfret, Conn., State road; M. A. Gammino Construction Co., Providence, R. I., contractor.
  100 Tons, Newington-Wethersfield, Conn., State bridge; D. V. Frione & Co., Inc., New Haven, Conn., contractor.
  100 Tons, Cheektowaga Township, N. Y., town disposal plant; bids March 31.

#### CENTRAL STATES

1500 Tons, Macomb County, Mich., Hudson Motor Co. Naval ordnance plant.

#### HAWAII

285 Tons, Schofield Barracks, T. H., administration barracks; bids March 31.

### Cast Iron Pipe

Boston has awarded 270 tons of 8-in., class 250, pipe to Warren Pipe Co. of Massachusetts.

**Leominster, Mass.**, has placed 2500 ft. of 8-in. and 2000 ft. of 6-in. pipe with Warren Pipe Co. of Massachusetts.

Bangor, Me., Army airplane base, has placed about 19,000 ft. of 6 to 16-in, pipe to R. D. Wood Co. for water mains.

Cumberland, R. I., contemplates water supimprovements between Rawson's Po Arnold's Mill bridge. Federal grant \$166,823 has been appropriated for project and city will furnish \$55,551.

Central Construction Co., Lawrence, Mass. has placed approximately 19,000 ft. of 6 to 16-in. pipe with Warren Pipe Co. of Massachusetts for Army's airplane base at Man-chester, N. H.

Water Works Department, Mobile, Ala., John R. Peavy, superintendent, plans extensions in water pipe lines for national defense projects now under way at and near city, including main and distribution lines. Cost about \$640,000. Addition also is planned to main pumping station at Bienville and water purification plant, estimated at \$750,-000; and extensions and improvements in water reservoirs at Bienville and Springhill. to cost about \$30,000.

Solomon, Kan., plans pipe line extensions and replacements in water system; also other waterworks improvements. Cost about \$30,000. Financing is being arranged through Federal aid. Paulette & Wilson. Public Utilities Building, Salina, Kan., are consulting one property.

Poplar, Wis., plans pipe lines for system and other waterworks installation. Cost about \$36,400. Financing is being arranged through Federal aid. Leo Peleske, ranged through Federal aid. Leo Superior, Wis., is consulting engineer.

Water Department, Tacoma, Wash., plans improvements in pipe lines for water system, including replacement of present main line in Park Avenue, from South 35th to South 96th Street. Cost over \$500,000. C. D. Forsbeck. City Hall, is city engineer.

Concord, N. C., plans pipe line extensions in water system; also two new elevated steel tanks and towers, 1,000,000-gal. and 100,000-gal. capacity, respectively, new filter station. and other waterworks installation. Gilbert C. White Co., Durham, N. C., is consulting engi-

Salisbury, N. C., H. C. Holmes, city manager, plans about eight miles for extensions and replacements in water system; also new 200,000-gal. elevated steel tank and tower, reservoir and extensions in filtration. Fund of about \$296,000 is being arranged through Federal aid for this and extensions in sewer lines, latter to approximate 12 miles. J. A. English is city engineer.

Woodstock, Ill., will take bids soon for pipe lines for water system; also for elevated steel tank and tower. Cost about \$50,000. Alvord, Burdick & Howson, 20 North Wacker Drive. Chicago, are consulting engineers.

San Diego, Cal., has awarded 2650 tons of 16 and 18-in. pipe to United States Pipe & Foundry Co., San Francisco, for Pacific Beach

Whittier, Cal., has taken bids on 122 tons of 6-in. pipe, with alternate figures submitted on 245 tons.

Long Beach, Cal., takes bids March 27 on 1330 tons of 6, 8 and 12-in. pipe and fittings. with alternates on asbestos-cement pipe.

Ventura, Cal., has awarded 120 tons of 10-in. pipe to American Cast Iron Pipe Co., Los 'Angeles.

Long Beach, Cal., has awarded 50,000 ft. of 3-in., 20,000 ft. of 4-in., 10,000 ft. of 6-in., and 5000 ft. of 10-in. grade A seamless pipe to Crane Co., Los Angeles.

### Pipe Lines

Magnolia Pipe Line Co., Magnolia Building. Dallas, Tex., has approved installation of new 4-in. pressure pipe line from LaGloria, Tex., 4-in. pressure pipe line from LaGloria, Tex., oil field to Premont, Jim Wells County, Tex., about 28 miles, with 6-in. line paralleling new line for about 20 miles for crude oil transmission, connecting with present pipe line system at last noted place. Cast iron, welded-joint pipe will be used. Booster pumping station will be installed at LaGloria. Cost close to \$200,000. close to \$200,000.

Southern Gas Co., Longview, Tex., Lacy, president, plans two 4-in. paralleling welded steel pipe lines from gas field at Willow Springs, Tex., to Longview, for natural gas transmission to latter place. Cost about \$100,000.

United States Engineer Office, Louisville, asks bids until April 3 for new 8-in, high-pressure steam service line, about 2200 ft. long, at Chanute Field, Ill.

Natural Gas Pipe Line Co. of America, Inc., Natural Gas Pipe Line Co. of America, Inc., Chicago, plans new 36-in. welded steel pipe line through section of Mills County, Iowa, paralleling a 24-in. line now in service, for natural gas transmission.

Corpus Christi, Tex., plans extensions in pressure pipe line system for gas distribution in Westgate Heights, a new sub-division of city. H. T. Cunningham, Nixon Building, is consulting engineer.

Pasadena, Cal., has low bid from Southern Pipe & Casing Co., Azusa, Cal., for 4060 ft. of 16-in. welded steel water pipe, with asbestos wrapping, etc., at \$10,603.20.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 1 for steel pipe and steel tubing for Portsmouth, N. H., and Mare Island Navy Yards (Schedule 5939).

Commanding Officer, Ellington Field, Houston, Tex., plans early call for bids for pressure pipe line system for gas distribution at local field. Cost about \$150,000.

Boerne, Kendall County, Tex., plans pres pipe line system for natural gas distribution, including main welded steel pipe line for con-nection with supply source, control station and other facilities

## Prices of Finished Iron and Steel ...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point													DEL	VEREI	10
Product	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS Hot rolled	2.10¢	2.106	2.10é	2.10€	2.10é	2,10é	2.10é	2.10é	2,20é	2.106		2.65€	2.20€	2.34€	2.27 €
Cold rolled <sup>1</sup>	3.05€	3.05¢	3.05¢	3.05€		3.05€	3.05¢		3.15¢	3.05€		3.70€	3.15¢	3.39€	3.37 €
Galvanized (24 ga.)	3.50€	3.50€	3.50¢		3.50€	3.50€	3.50 €	3.50¢	3.60€	3.50€		4.05€		3.74€	3.67€
Enameling (20 ga.)	3.35€	3.35∉	3.35€	3.35€			3.35€		3.45€	3.35€		4.00 €	3.45€	3.71∉	
Long ternes <sup>2</sup>	3.80 €		3.80 €									4.55€			
Wrought iron	4.75¢														
STRIP Hot rolled <sup>3</sup>	2.10¢	2.10€	2.10∉	2.10¢	2.10€		2.10€			2.10€		2.75∉	2.20€		
Cold rolled4	2.80€	2.90€		2.80€			2.80€	(Wo	rcester =	3.00¢)			2.90€		
Cooperage stock	2.20€	2.20€			2.20€		2.20€								
Commodity C-R	2.95€			2.95∉			2.95∉	(Wo	rcester =	3.35¢)			3.05€		
TIN PLATE Standard cokes (Per 100-ib. base box)	\$5.00	\$5.00	\$5.00						\$5.10						
BLACK PLATE 29 gage <sup>5</sup>	3.05∉	3.05¢	3.05∉						3.15¢			4.05¢			
TERNES, M'FG. Special coated (Per base box)	\$4.30		\$4.30						\$4.40						
BARS Carbon steel	2.15¢	2.15∉	2.15∉	2.15¢	2.15∉	2.15∉		(D	uluth - 2	2.25¢)	2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel <sup>6</sup>	2.15¢	2.15∉	2.15∉	2.15∉	2.15∉	2.15¢					2.50 €	2.80€			
Reinforcing (billet)7	2.15¢	2,15é	2.15é	2.15é	2.15é	2.15é	2.15é	2.15¢	-	-	2.50€	2.55¢	2.25€	-	-
Reinforcing (rail)	2.05€	-	2.05€	2.05∉	2.05€	2.05∉	2.05€	2.107			2.40€	2.45¢	-		
Cold finished <sup>8</sup>	2.65€	2.65€	2.65∉	2.65¢		2.65∉		-	(Detro	it-2.70¢)					
PLATES  Carbon steel	2.10¢	2.10¢	2.10¢	2.10€	2.10∉		2.10€	2.10€	Clay	wille and mont =	2.45€	2.65€		2.29	2.15
Wrought iron	3.80 €							-		-					
Floor plates	3.35€	3.35€									3.70∉	4.00 €		3.71	
Alloy	3.50€	3.50 €			(Cos	tesville=	3.50¢)								
SHAPES Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		Bethleh	em = 2.1	0 €)	2.45¢	2.75		2.27	2,218
SPRING STEEL C-R 0.26 to 0.50 Carbon	2.80∉			2.80¢			(We	reester	3.00¢)						
0.51 to 0.75 Carbon	4.30 €			4.30€			(We	rcester -	4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15∉			(We	rcester =	6.35€)						
1.01 to 1.25 Carbon	8.35¢			8.35∉			(We	rcester =	8.55¢)						
WIRE® Bright	2.60€	2.60€		2.60¢	2.60€		(We	orcester =	2.70¢)						
Galvanized	2.60€	2.60¢		2.60∉	2.60 €		(We	orcester -	2.70¢)						
Spring	3.20€	3.20 €		3.20 €			(W	rcester -	3.30¢)						
PILING Steel sheet	2.40€	2.40€				2.40€						2.95	£		
IRON BARS Common		2.25¢			(Ter	re Haute	e, Ind	2.15¢)							
Refined	3.756				-				1						
Wrought	4.40¢	1		1								1			

<sup>&</sup>lt;sup>1</sup> Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. <sup>2</sup> Unassorted 8-lb. coating. <sup>3</sup> Widths up to 12 in. <sup>4</sup> Carbon 0.25 per cent and less. <sup>5</sup> Applies to 29 gage within certain width and length limitations. <sup>5</sup> For merchant trade. <sup>7</sup> Straight lengths as quoted by distributers. <sup>5</sup> Also shafting. For quantities of 20,000 to 39,999 lb. <sup>5</sup> Carload lots to manufacturing trade. <sup>10</sup> Boxed.

SEM	I-F	IN	SI	HE	DS	TEFL
~= 1 7 1		11 41		1 1 hard		I has been been

Billets, Blooms and Slabs	Rillets	Blooms	and	Slahs
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Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher f.o.b. Duluth, billets only, \$2 higher.

									ss Ton
Rerolling			*		,				\$34.00
Forging quality				*					40.00
Shell Steel									

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

			oss Ton
			\$52.00
			54.00
			56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

#### Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Spar-rows Point, Md. Per Gross Ton Open hearth or bessemer \$34.00

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 1.90c.

Wire Rods																	
(No.	5	ŧ	0		9	1	3 2	3	i	n	.)	)				E	er Lb.
Pittsburgh, Cl	ni	C	a	Q	0		(		le	V	e	1	a	n	d		2.00c.
Worcester, M.	as	35	· .	-											_		2.10c.
Birmingham							•			•	•		Ì	•		•	2.00c
San Francisco	,	•	•	۰								•	•		0		2.500
Galveston				٠	٠		0		D		۰	0	0		0	٠	2.000.
9/29 in to 47	1	0	4	. 2			-										2.20C.

9/32 in. to 47/64 in., \$3 a net ton higher. Quantity extras apply.

#### ROOFING TERNE PLATE

(F.o.b.	Pittsbur	gh;	P	nckage, 20x14 in.	112 Sheets 20x28 in.
8-lb.	coating	I.C.		\$6.00	\$12.00
15-lb.	coating	I.C		7.00	14.00
20-lb.	coating	I.C		7.50	15.00
25-lb.	coating	I.C.,		8.00	16.00
	coating			8.63	17.25
40-lb.	coating	I.C		9.75	19.50

#### WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago,
Cleveland, Birmingham)
Base per Keg
Standard wire nails\$2.55
Coated nails 2.55
Cut nails, carloads 3.85
Base per 100 Lb.
Annealed fence wire\$3.05
Base Column
Woven wire fence* 67
Fence posts (carloads) 69
Single loop bale ties 59
Galvanized barbed wiret 70
Twisted barbless wire 70

•15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

#### BOLTS, NUTS, RIVETS, SET SCREWS

#### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off Lis
M	achine and carriage bolts:
	½ in. and smaller by 6 in. and
	shorter
	9/16 and % in. by 6 in. and
	shorter
	34 to 1 in. by 6 in. and shorter 64
	1% in. and larger, all lengths62
	All diameters over 6 in. long. 62
	Lagrall sizes

Plow bolts
Hot pressed nuts; c.p.c., t-nuts;
square, hex., blank or tapped:
½ in. and smaller
9/16 to 1 in. inclusive63
1% to 1½ in. inclusive61
1% in. and larger

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above ite additional 5 per cent allo load shipments.		
Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in, and smaller	66	70
9/16 to 1 in.	63	65

11% in. through 1½ in.. 61 62 15% in. and larger.... 60 In full container lots, 10 per cent additional discount.

Stove	bolts,	p	аскад	es	,	n	ıu	US	79	10	0	S	9	10	10
Stove								it	h	n	u	t	S		10
atta	ched									٠		6		73	
Stove	bolts	in	bulk								*			81	

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

#### Large Rivets

(½ in. and larger)

Base per 100 Lb. F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....\$3.40

#### Small Rivets

(7/16 in. and smaller) F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....65 and 10

#### Can and Sat Scrows

List
50
64
73
68
0.0
74
52
02

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

#### NON-FERROUS PRICES

#### Cents per lb. for early delivery

Copper, Electrolytic <sup>1</sup>		Mar. 20 12.00 12.00	Mar. 21 12.00 12.00	Mar. 22 12.00 12.00	Mar. 24 12.00 12.00	Mar. 25 12.00 12.00
Copper, Lake Tin, Straits, New York <sup>2</sup> .	52,375	52.75	52.50		52.50	52.50
Zinc, East St. Louis Lead, St. Louis <sup>3</sup>		7.25 5.60	7.25 5.60	7.25 5.60	7.25 5.60	7.25 5.60

<sup>1</sup> Mine producers' quotations only, delivered Conn. Valley. Deduct <sup>1</sup>4c. for approximate New York delivery price. <sup>2</sup> Add 0.39c. for New York delivery. <sup>8</sup> Add 0.15c. for New York delivery.

#### Warehouse Products

#### Cents per lb., Delivered

Tin	New York	Cleve-
Straits pig		
Copper		
Electro		14.50
Castings		13.50
H. R. Sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow sheets*	18.65	18.65
Yellow, rods*	13.67	13.67
Seamless tubes*	21.40	21.40
Zinc Slabs		
Lead		
American pig	6.75	6.25
Bar	8.60	8.75
Cut sheets	8.90	9.00
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt., 98-99%	18.00	18.50
Solder ½ and ½	32.085	32.75

Anti-friction grade .. 23.50 21.75

Babbitt

#### Old Metals

Cents per lb., New York
Buying prices are paid by dealers
for miscellaneous lots from smaller
accumulators. Selling prices are those
charged to consumers after the metal anared for their use

nas veen preparea jo	Dealers' Buying Prices	Dealers'
Copper Hvy. crucible Hvy. and wire Light and bottoms.	. 9.875	11.50 10.275 9.375
Brass Heavy Light No. 1 yel. turn No. 1 red or compo turnings Hvy. Mach. compo.	5.75 • 6.25 •	7.25 6.50 6.75 10.75 10.225
Lead Heavy		5.50
Aluminum Cast Sheet Zinc	11	.00 - 13.50

#### Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 17c.-18c. a lb.; No. 12 remelt No. 2 standard, 16c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. Antimony, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. Quick-SILVER, \$180, per flask of 76 lb. Brass Ingots, commercial 85-5-5-5, 13.25c. a lb.

\*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras; on copper sheets, 33½: on brass sheets and rods, 40: on brass tubes, 33½, and copper tubes, 40.

#### **ALLOY STEEL**

#### Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem ......\$54.00

#### Alloy Steel Bars

2000 (1.5 Ni) .....\$0.35

	2100	(1.5)	Ni	)			٠.												0.75
	2300	(3.5	Ni																1.70
	2500	(5 I	Vi)																2.55
	3100	Ni-C	r																0.70
	3200	Ni-C	r																1.35
	3300	Ni-C	r																3.80
	3400	Ni-C	r																3.20
	4100																		0.55
	4100	Cr-N	Io	(1	0.	2	5	to	0	0	).4	4(	)	N	10	0.	)		0.75
	x434																		1.70
	4340																		1.85
	4600																		1.20
	5100																		0.35
	5100																		0.45
	5100																		0.15
	52-10																		2.60
	6100																		
1	0100	CI-1	L	d.	L	*	* 1					*				×		×	1.20

6100 Cr-V spring steel..... 0.85 C-V ..... 0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in, and 2½ in, thick or over take the billet base.

#### Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c. carlots.

#### Alloy Steel Plates

### STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

#### Chromium-Nickel

No.	304	302
Forging billets	.21.25c.	20.40c
Bars	.25.00c.	24.00c
Plates	.29.00c.	27.00c
Structural shapes	.25.00c.	24.00c
Sheets	.36.00c.	34.00c
Hot rolled strip	.23.50c.	21.50c
Cold rolled strip	.30.00c.	28.00e
Drawn wire	.25.00c.	24.00e

#### Straight-Chromium

No.	410	430	442	446
Bars	.18.50c.	19.00c.	22.50c.	27.50c.
Plates .	.21.50c.	22.00c.	25.50c.	30.50c.
Sheets .	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip	17.00c.	17.50c.	24.00c.	35,00c.
C'ld st	22.00c	22 50c	32 00c	52.00e

#### 20% Chromium-Nickel Clad Steel

00 10 0		4,				-					•		4		*	29				1			
																						No.	304
Plates																						18.0	0c.*
Sheets					*																	19.0	Oc.
*Inclu	d	es	3	8	ır	11	16	98	1	ir	18	5	8	ır	d	I	r	1	el	k!	li	ng.	

#### TOOL STEEL

#### (Fob Dittehungh

			(1	P.	0	.1	b.		Į	74	ti	ts	b	u	r	g	h	)						
																-		L	30	18	36	1	p€	r Lb
High sp	e	e	d			0																		67c.
High-ca:	rl	00	)1	1.	-0	ŀ	11	•	r	n	iı	u	m	1										43c.
Oil-hard																								
Special																								
Extra .													*					,						18c.
Regular																				i				14c.

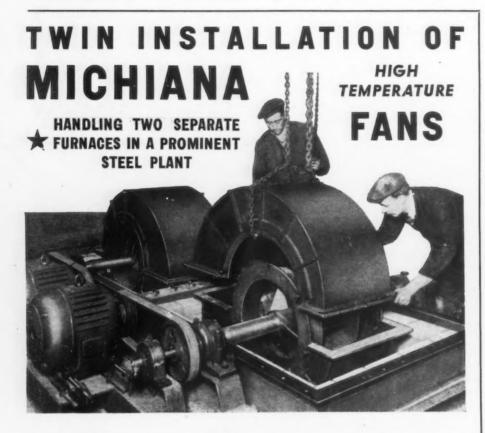
Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

#### **ELECTRICAL SHEETS**

/B - b D/M-bunchi

(F.o.b. Pittsburgh)																	
Base per L															per Lb.		
Field grade																	3.20c.
Armature																	
Electrical		*															4.05c.
Motor																	4.95c.
Dynamo																	5.65c.
Transformer	7	2															6.15c.
Transformer	6	15	,														7.15c.
Transformer	672	8	3														7.65c.
Transformer	673	52	2														8.45c.

Silicon strip in colls—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.



© Compactness and ease of installation are demonstrated in the application of MICHIANA FANS illustrated. ● These FANS provide controlled recirculation of high temperature gasses or products of combustion, resulting in big savings—and because of their design and construction, maintenance costs are low and costly shutdowns eliminated. THEY STAY ON THE JOB.

 MICHIANA High Temperature FANS are made of suitable heat resistant alloy, accurately machined, with the added features of NO BOLTS—SCREWS

—RIVETS or WELDS, while the design and construction provide for free and independent expansion of all parts radially and axially.

• Let us help you with your problems by recommending the right High Temperature Fan for your requirements. Results are guaranteed.

### MICHIANA PRODUCTS CORP.

Michigan City, Indiana

### CAST IRON WATER PIPE

Per Ne	t Ton
6-in. and larger, del'd Chicago\$	
6-in. and larger, del'd New York	
6-in. and larger, Birmingham.	46.00
6-in. and larger f.o.b. dock, San	
Francisco or Los Angeles or	
Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

### **BOILER TUBES**

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall

(Net base prices per 100 ft., f.o.b. Pitts-burgh, in carload lots)

Lap
Seamless Weld,
Cold Hot Hot
Drawn Rolled Rolled
in. o.d.13 B.W.G. \$9.01 \$7.82
1¼ in. o.d.13 B.W.G. 10.67 9.26
1½ in. o.d.13 B.W.G. 11.70 10.23 \$9.72
1% in. o.d.13 B.W.G. 13.42 11.64 11.06
2 in. o.d.13 B.W.G. 15.03 13.04 12.38
2¼ in. o.d.13 B.W.G. 16.76 14.54 13.79
21/4 in. o.d.12 B.W.G. 18.45 16.01 15.16
2½ in. o.d.12 B.W.G. 20.21 17.54 16.58
2% in. o.d.12 B.W.G. 21.42 18.59 17.54
3 in. o.d.12 B.W.G. 22.48 19.50 18.35
3½ in. o.d.11 B.W.G. 28.37 24.62 23.15
4 in. o.d.10 B.W.G. 35.20 30.54 28.66
4½ in. o.d.10 B.W.G. 43.04 37.35 35.22
5 in. o.d. 9 B.W.G. 54.01 46.87 44.25
6 in. o.d. 7 B.W.G. 82.93 71.96 68.14
Extras for less carload quantities:
40,000 lb. or ft. over
30,000 lb. or ft. to 39,999 lb. or ft. 5%
20,000 lb. or ft. to 29,999 lb. or ft. 10%
10,000 lb. or ft. to 19,999 lb. or ft. 20%
5,000 lb. or ft. to 9,999 lb. or ft. 30%
2,000 lb .or ft. to 4,999 lb. or ft. 45%
Under 2,000 lb. or ft 65%

# STEEL AND WROUGHT IRON PIPE AND TUBING Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought iron pipe)

Base Price = \$200 Per Net Ton

### Butt Weld

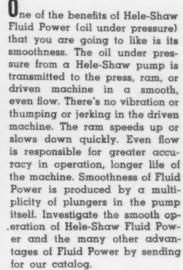
Steel	Black	Galv.
1/8 in	. 56	36
¼ to % in	. 59	43 1/2
½ in	63 1/2	54
% in	661/2	58
1 to 3 in	. 681/2	601/2
Wrought Iron	Black	Galv.
¼ and % in	.+9	+10
½ in		61/2
% in	. 30	13
1 and 11/4 in	. 34	19
1½ in	. 38	211/2
2 in	371/2	21
Lap We	ld	
Steel		
2 in	. 61	521/2
21/2 and 3 in	64	551/2
3½ to 6 in	. 66	571/4
7 and 8 in	. 65	551/2
9 and 10 in	641/2	55
11 and 12 in	63 1/2	54
Wrought Iron		
2 in	301/2	15
2½ to 3½ in	. 311/2	171/2
4 in.	331/2	21
4½ to 8 in	321/2	20
9 to 12 in	281/2	15

Butt weld, extra strong, plain	ends
Steel Black	Galv.
1/8 in	411/2
1/4 to 3/8 in 56 1/2	451/2
½ in 61½	53 1/2
34 in 65½	
1 to 3 in 67	60
Wrought Iron       ¼ and % in.     +10       ½ in.     25       ¾ in.     31       1 to 2 in.     38	$+43$ $9$ $15$ $22\frac{1}{2}$
Lap weld, extra strong, plain         Steel       2 in.       59         2½ and 3 in.       63         3½ to 6 in.       66½	51½ 55½ 59

7 and 8 in 9 and 10 in 11 and 12 in.	$64\frac{1}{2}$	56 55 54
Wrought Iron 2 in		181/2
2½ to 4 in	39	25½ 24
7 and 8 in	381/2	24½ 20½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld 8 in. and smaller.



NOTE IT FOR SMOOTHNESS

Fluid Power Pump



Cross sectional
view of the HeleShaw Pump showing the multiplicity of plungers
which are responsible for the smooth,
even flow of HeleShaw Fluid Power.



Southwark - fate - Emery Universal Testing Machine, smoothly powered by a Hele-Shaw Pump.

OTHER A-E-CO PRODUCTS: LO-HED HOISTS, TAYLOR STOKERS, MARINE DECK AUXILIARIES

### AMERICAN ENGINEERING

ARAMINGO AVENUE, PHILADELPHIA.

### ORES

Lake	Superior	Ores

Delivered Lower Lake Ports Per Gross Ton

Old range, bessemer, 51.50%... \$4.75 Old range, non-bessemer, 51.50% Mesaba, bessemer, 51.50% Mesaba, non-bessemer, 51.50%. 4.60 4.60 High phosphorus, 51.50%..... 4 35

Foreign Ores'

C.i.f. Philadelphia or Baltimore. Exclusive of Duty

African, Indian, 44 to 48% Mn.

57c. to 61c.

African, Indian, 49 to 51% Mn. 60c. to 65c. Brazilian, 46 to 48% Mn...54c. to 59c. Cuban, del'd, duty free, 51% Mn.

Tungsten, Chinese, Wolframite, duty paid, delivered ... \$23 to \$24

Tungsten, domestic, scheelite,
delivered ... \$23.00

Chrome ore, lump c.i.f. Atlantic

67½c. to 71c. Per Short Ton Unit

an assist! By AT To Lower Costs!

> Here Atlas · designed, Atlas · built equipment moves heavy scrap and other charging materials with consummate ease.

> Monorail deposits empty bucket on roller conveyor. Bucket rolls down to scale platform, is charged with iron, weight read from yard crane cab. Scale platform lowers, turns, bucket rolls down to monorail for pickup and charge to cupola.

> A propitious circle, presaging profit at the year-endand a definitely typical Atlas installation.

# THE ATLAS CAR & MFG.

Engineers

CLEVELAND, OHIO

Manufacturers

serving the world with mobile handling equipment

### RAILS. TRACK SUPPLIES

F.o.b. Mill Standard rails, heavier than 60

Standard rails, heavier than ou
lb., gross ton\$40.00
Angle bars, 100 lb 2.70
F.o.b. Basing Points
Light rails (from billets), gross
ton\$40.00
Light rails (from rail steel),
gross ton 39.00
Base per Lb.
Cut spikes 3.00c.
Screw spikes 4.55c.
Tie plates, steel 2.15c.

Tie plates, Pacific Coast.... Track bolts, steam railroads Track bolts, discount to jobbers 2 30c 4.15c. all sizes (per 100 counts)....

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

# FLUORSPAR Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail... \$20.00 to \$21.00 Domestic, f.o.b. Ohio River landing barges .........20.00 to 21.00 ports, duty paid ...... Nominal Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illi-nois and Kentucky mines.... . 31,00 As above, in bags, f.o.b. same .... 32.60 mines

# **REFRACTORIES**

Fire Clay Brick Per 1000 f.o.b. Works Super-duty brick at St. Louis. . \$60.80 irst quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois
First quality, New Jersey
Second quality, Pennsylvania,
Maryland, Kentucky, Missouri and Illinois
Second quality, New Jersey
No. 1 Ohio and Illinois 47.50 39 90 Ground fire clay, per ton Silica Brick Pennsylvania \$47.50 

Chrome Brick Standard f.o.b. Baltimore, Plymouth Meeting and Chester. \$50.00 Chemically bonded f.o.b. Balti-more, Plymouth Meeting and Chester, Pa.

Magnesite Brick

Standard f.o.b. Baltimore and Chemically bonded, f.o.b. Baltimore more ..... 61.00

Grain Magnesite

\*None available.

# **FERROALLOYS**

Feri	rom	an	gar	iese
------	-----	----	-----	------

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton Domestic, 80% (carload) . . . . . \$120.00

Spiegeleisen

Per Gross Ton Furnace Domestic, 19 to 21% . . . . . . \$36.00 Domestic, 26 to 28% . . . . . . . . . . . . 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size 50% (carload lots, bulk) .... \$74.50\* 50% (ton lots, packed .... 87.00\* 75% (carload lots, bulk) .... 135.00\* 75% (ton lots, packed)......151.00\*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio 10.00 to 10.50%.....\$34.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton. For each unit of manganese over 2% \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron , Per Gross Ton, F.o.b. Jackson, Ohio 5.00 to 5.50%.....\$28.50

For each additional 0.5% silicon up to 2%, 50c. a ton is added. Above 12%

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

### Ferrochrome

Per Lb. Contained Cr., Deliver Lump Size, on Control	red Carlots
4 to 6% carbon	11.00c.
2% carbon	17.50c.
1% carbon	18.50c.
0.10% carbon	
0.06% carbon	21.00c.

Spot prices are 1/4 c. per lb. of contained chromium higher.

### Silico-Manganoso

Per	Gross	Delivered, on Contrac	Size,

3%	cai	rbon			×		*						\$113.00*
2.50	%	carb	0	n							0		118.00*
													123.00*
1%	car	rbon											133.00*

### Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload	\$2.00
Ferrotungsten, 100 lb. and less	2.25
Ferrovanadium, contract, per	2.20
lb and in 1 1 1 1 1 00 70 4	00.004
lb. contained V, del'd \$2.70 to	\$2.907
Ferrocolumbium, per lb. con-	
tained columbium f.o.b.	
Niagara Falls, N. Y., ton	
	00 OF 1
lots	\$2.25†
Ferrocarbontitanium, 15 to	
18% Ti, 7 to 8% C, f.o.b.	
furnace, carload and con-	
	140 50
tract, per net ton\$1	142.50
Ferrocarbontitanium, 17 to	
20% Ti, 3 to 5% C, f.o.b.	
furnace, carload and con-	
	15750
tract per net ton\$1	191,90

\*Spot prices are \$5 per ton higher. †Spot prices are 10c. per 1b. of contained element higher.

]	Ferrophosphorus, electric or
	blast furnace material, in
	carloads, f.o.b. Anniston,
	Ala., for 18%, with \$3 unit-
	age, freight equalized with
	Rockdale, Tenn., per gross
	ton

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsato (Siglo), Tenn., Monsato (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville .....

Ferromolybdenum, per lb. Mo, f.o.b. furnace .....

Calcium molybdate, per lb. Mo, f.o.b. furnace ........ Molybdenum oxide briquettes 80c. 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

### FUEL OIL

1022 012								
No. 3, f.o.b. Bayonne, N. J4.00c.								
No. 6, f.o.b. Bayonne, N. J2.98c.								
No. 5 Bur. Stds., del'd Chicago 3.25c.								
No. 6 Bur. Stds., del'd Chicago2.75c.								
No. 3 distillate, del'd Cleveland5.50c.								
No. 4 industrial, del'd Cleveland . 5.25c.								
No. 5 industrial, del'd Cleveland. 5.00c.								
No. 6 industrial, del'd Cleveland 4.75c.								

# SHAW BOX is a buyword

58.50

Through long years, owners, executives and operators have learned the vast knowledge, the efficiency and great savings represented by "Shaw-Box" in the lifting industry.

Seldom is a crane bought without "Shaw-Box" comparisons and when all the figures have been totalled and results tabulated, the words "Shaw-Box" become part of a

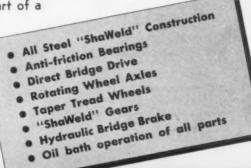
large percentage of specifications.

The reasons are plain to the men who know cranes: Here, for example, are the features of the Type S Shaw-Box Crane.

These features mean the application of most modern crane engineering to Shaw-Box Cranes. Yet there is no price premium to secure these advantages.

Shaw-Box makes cranes in all sizes from small hand-operated cranes of 500 lb. capacity to 450 ton travelling electric cranes.

Send for catalog with complete information, illustrations, dimensions and specifications. Let us quote on all your crane



SHAW-BOX CRANE & HOIST DIVISION MANNING, MAXWELL & MOORE, INC. USKEGON, MICHIGAN



### COKE

Per Net Ton

\$10.75 to \$11.00

Furnace, f.o.b. Connellsville, prompt .....\$5.50 to \$5.75 Foundry, f.o.b. Connellsville, prompt .....\$6.00 to \$6.50 F'dry, by-product, Chicago .... 10.50 F'dry, by-product, New England 13.00 Foundry, by-product, Newark or Jersey City ......\$11.30 to \$11.90 F'dry, by-product, Philadelphia. 11.63 F'dry, by-product, Cleveland... 11.55 F'dry, by-product, Cincinnati 11.00 Foundry, Birmingham ..... 7.50

F'dry, by-product, St. Louis

### BRITISH

Per Gross Ton, f.o.b. United Kingdom Ferromanganese, export £29 16s. 3d. Tin plate, per base box. 32s. to 33s. Steel bars, open hearth . £16 10s. Beams, open hearth....£19 10s. Channels, open hearth..£19 10s. Angles, open hearth....£15 10s. Black sheets, No. 24, gage £22 5s. max.\* £22 5s. min.\*\* Galvanized sheets, No. 24 gage £25 12s. 6d. max.\*; £25 12s. 6d.

\*Empire markets only.

min.\*\*

# PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.	
Boston	\$25.50	\$25.00	\$26.50	\$26.00		
Brooklyn	27.50			28.00	*****	
Jersey City	26.53	26.03	27.53	27.03		
Philadelphia	25.84	25.34	26.84	26.34	*****	
Bethlehem, Pa	\$25.00	\$24.50	\$26.00	\$25.50		
Everett, Mass	25.00	24.50	26.00	25.50		
Swedeland, Pa	25.00	24.50	26.00	25.50		
Steelton, Pa		24.50			29.50	
Birdsboro, Pa	25.00	24.50	26.00	25.50	29.50	
Sparrows Point, Md	25.00	24.50				
Erie, Pa	24.00	23.50	25.00	24.50		
Neville Island, Pa	24.00	23.50	24.50	24.00		
	24.00	23.50	24.50	24.00		
Sharpsville, Pa.†† Buffalo	24.00	23.00	25.00	24.50	29.50	
Cincinnati	24.44	24.61	20.00	25.11		
Canton, Ohio	25.39	24.89	25.89 26.44	25.39 25.94		
Mansfield, Ohio	25.94	25.44			*****	
St. Louis	24.50	24.02	24.50	24.00		
Chicago	24.00	23.50			*****	
Granite City, Ill	24.00	23.50	24.50	24.00	****	
Cleveland	24.00	23.50	24.50	24.00		
Hamilton, Ohio	24.00	23.50		24.00		
Toledo	24.00	23.50	24.50	24.00		
Youngstown ††	24.00	23.50	24.50	24.00		
Detroit	24.00	23.50	24.50	24.00	****	
St. Paul	26.63		27.13	26.63		
Duluth	24.50		25.00	24.50		
Birmingham	20.38	19.00	25.00			
Los Angeles, San Fran-			20.00			
cisco and Seattle	27.50					
Provo, Utah	22.00	*****				
Montreal†	27.50	27.50		28.00		
Toronto t		25.50		26.00		
Toronto†	25.50			26.00		

GRAY FORGE

CHARCOAL Lake Superior fce.....\$27.00 Delivered Chicago .

Valley or Pittsburgh fce.....\$23.50

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged. ††Pittsburgh Coke & Iron and Struthers furnaces are quoting \$24.50 a ton for No. 2 foundry, basic and malleable, and \$25.00 a ton for bessemer iron at Sharpsville and Youngstown.

# WAREHOUSE PRICES

	Pitts-	CIL:	Cleve-	Phila-	New	D.1	D. C. 1	D	Birm-	St.	St	Mil-	Los
	burgh	Chicago	land	delphia	York	Detroit	Buffalo	Boston	ingham	Louis	Paul	waukee	Angeles
Sheets, hot rolled	\$3.35	\$3.05	\$3.35	\$3.75	\$3.58	\$3.23	\$3.25	\$3.71	\$3.45	\$3.39	\$3.30	\$3.38	\$4.30
Sheets, cold rolled		4.10	4.05	4.05	4.40	4.30	4.30	3.68		4.12	4.35	4.23	6.50
Sheets, galvanized	4.75	4.60	4.62	4.90	5.00	4.64	4.75	5.11	4.75	4.87	4.75	4.98	5.25
Strip, hot rolled	3.60	3.40	3.50	3.95	3.96	3.48*	3.82	4.06	3.70	3.74	3.65	3.73	
Strip, cold rolled	3.20	3.30	3.20	3.31	3.51	3.20	3.22	3.46		3.61	3.83	3.54	
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.35	3.69	3.80	3.68	4.15
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.15
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.	7.20	7.10	7.55	7.31	7.60	7.42	7.35	7.50		7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100.	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05		6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300.	8.15	8.15	8.40	8.56	8.84	8.45	8.40	8.63		8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100.	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23		7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions; Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, 400 to 1499 lb.; hot rolled sheets, 400 to 1499 lb.; bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets. 300 to 1996 lb., galvanized sheets. 300 to 1996 lb., galvanized sheets. \$3.23.

<sup>\*\*</sup>Other than Empire markets.



NATIONAL DEFENSE ROLLS ON BOWER ROLLER BEARINGS

# Sales Possibilities

# . . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

# North Atlantic States

• New Britain Machine Co., 140 Chestnut Street, New Britain, Conn., serow machine Street, New Britain, Conn., screw machine products, has let general contract to Hasson products, has let general contract to Hasson & Downes, 55 West Main Street, for one-story addition, 90 x 280 ft., for production of aircraft engine parts for Navy Department. This is part of expansion to be carried out for Federal work, for which Government has au-thorized fund of \$409,000.

horized fund of \$409,000.

Revere Copper & Brass, Inc., 230 Park Avenue, New York, has let general contract to Sullivan Foster, Inc., 43 William Street, New Bedford, Mass., for one-story addition to mill, 130 x 250 ft., at New Bedford. Cost over \$150,000 with equipment.

M. B. Mfg. Co., New Haven, Conn., metherical

chanical equipment, plans one-story addition for production of aircraft parts for Govern-ment, which will provide fund of \$130,000 for

Lapointe Machine Tool Co., Hudson, Mass broaching machinery and parts, has let general contract to J. J. Prindiville Co., Framingham, Mass., for one-story addition, 20 x 160 ft. Cost close to \$65,000 with

Raybestos Division of Raybestos-Manhattan, Inc., Stratford, Conn., brake lining, brakes and kindred equipment, has approved plans for one-story addition, 60 x 360 ft. Cost close to \$100,000 with equipment.

close to \$100,000 with equipment.

Celanese Corp. of America, Inc., 180 Madison Avenue, New York, rayon products, has let general contract to George F. Hazelwood Co., Cumberland, Md., for additions to branch Co., Cumberland, Md., for additions to branch mill near Narrows, Va., forming a new production unit with main manufacturing division, chemical department, storage and distribution; also will build new machine shop tribution; also will build new machine shop and pumping station. Cost about \$1,500,000 with machinery.

N. Best Engineering Co., Inc., 90 West Street, New York, oil burners and parts, has leased one-story building, about 15,000 sq. ft. of floor space at Broad and Eleventh Streets, Carlstadt, N. J., for expansion, operating in conjunction with plant at Delawanna, in same

International Smelting & Refining Co., 25 Broadway, New York, has approved plans for new smelter at properties at Tooele, Utah, for recovery of zinc from slag, consisting of furnace units and auxiliary buildings for raw material handling, storage, distribution, etc. Cost close to \$300,000 with machinery.

Bethlehem Steel Corp., Shipbuilding Division, 25 Broadway, New York, has let general contract to George W. Rogers Construction Corp., 6 Church Street, for new shipway, outfitting pier and shops at Mariners Harbor, Staten Island shipbuilding plant, for construction of vessels for government. Cost about \$3,400,000, fund to be provided by govern-

Maggi Co., 76 Varick Street, New York. food products, has asked bids on general con-tract for new plant at New Milford, Conn., consisting of two four-story structures, 100 x 200 ft., and 100 x 180 ft. Cost close to \$300,-000 with equipment. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

General Electric Co., Schenectady, N. Y., has let general contract to E. C. Blanchard Co., 940 Broad Street, Lynn, Mass., for one and two-story addition, 50 x 200 ft., to Lynn Works. Cost over \$100,000 with equipment. C. Blanchard

Moore Steam Turbine Division, Worthington Pump & Machinery Corp., Wellsville, N. Y., plans one-story addition. Cost close to \$100,-

000 with equipment.

Rochester Products Division, General Motors Corp., 100 Lexington Avenue, Rochester, N. Y., precision instruments and parts, plans onestory addition, close to 15,000 sq. ft. of floor space, for production of aircraft control struments and parts for government.

close to \$100,000 with equipment.

Bignall Co., Medina, N. Y., iron and brass plumbing goods, has approved plans for twostory addition for expansion in foundry. Cost close to \$45,000.

Frontier Fuel Oil Corp., Ellicott Square, Buffalo, has work under way on multi-story addition to oil refinery at Tonawanda, N. Y., 100 ft. Cost over \$80,000 with equip-

Wright Aeronautical Corp., 132 Beckwith Avenue, Paterson, N. J., plans experimental test hangar, about 15,600 sq. ft. of floor space, at branch plant and airport, Caldwell, N. J. Cost close to \$100,000 with equipment.

Barnett Foundry & Machine Co., 536 Lyons Avenue, Irvington, N. J., iron. other metal castings, plans rebuilding part of pattern division recently destroyed by fire. Loss over \$100,000 with equipment.

Art Tube Co., 500 Lyons Avenue, Irvington, N. J., collapsible metallic tubing, plans one-story addition, about 25 x 300 ft. Cost close to \$100,000 with equipment. Raymond close to \$100,000 with equipment. Raymond B. Flatt, 50 Broad Street, Bloomfield, N. J., is architect.

National Oil Products Co., Harrison, N. J., sulphonated and other special oil products, has acquired former six-story building of Manufacturers' Can Co., First about 100,000 sq. ft. of floor and will remodel for expansion in storage, distribution and other departments.

National Standard Corp., Athenia Steel Division, Athenia, N. J., steel springs and other wire goods, has let general contract to Ivor Carlson, 126 Lincoln Avenue, for oneon. Cost close to \$50,000 with Alfonso Alvarez, Jr., Lakewood story addition. equipment. Alfonso Alvarez, Jr., Lakew Avenue, Cedar Grove, N. J., is architect.

Eclipse Machine Division, Bendix Aviation Corp., Oakwood Avenue, Elmira, N. Y., air-craft equipment, coaster brakes, etc., has pur-chased one-story building at Red Bank, N. J.,

and will modernize for branch plant.

Pennsylvania Forge Corp., Milnor
Bleigh Streets, Tacony, Philadelphia, Milnor Pennsylvama Forge School, Philadelphia, steel forgings, pipe flanges and kindred products, plans expansion, including considerable additional equipment for production of heavy steel forgings for Navy Department. Fund of \$2,500,000 will be provided by Government for project.

Proctor & Schwartz, Inc., Seventh Street and Tabor Road, Philadelphia, drying ma-chinery and parts, air-conditioning apparatus, etc., has leased about 10,000 sq. ft. of floor space in Guaranty industrial building, twenty-fourth and Market Streets, for expansion.

William Tolen & Sons, Inc., Emerald and Letterly Streets, Philadelphia, lighting equipment, lamps, etc., has leased about 13,000 sq. ft. of floor space in Building No. 18 at Dobson properties, Falls of Schuylkill, for expansion.

Department Property and Capitol Building, Harrisburg, Pa., Roger Capitol Building, Harrisburg, Pa., Roger W. Rowland, secretary, asks bids until April 2 for wire nails and bale ties for period from May 1 to July 31 (Class 129, Supplement C); until April 3 for general hardware from May to Oct. 31 (Class 129).

Vanadium-Alloys Steel Co., Latrobe. has approved plans for one-story addition, 65 x 140 ft., for expansion in melting department, with part of structure for storage and distribution. Cost over \$70,000 with equip-

Motive Parts Co., 6325 Penn Avenue, Pittsburgh, automobile parts and equipment, has let general contract to E. M. Bailey, 203 North Highland Avenue, for two-story and basement plant, 80 x 200 ft., at 6300 Penn Avenue, for

general production, storage and distribution.
Cost over \$75,000 with equipment.
General Purchasing Officer, Panama Canal,
Washington, asks bids until March 31 for six
2-ton monorail trolley hoists, 9-ft. lift (Schedule 4915); 32 steel oxygen cylinders, 220 cu. ft. at 2000 lb. capacity; one similar steel cylinder for use as hydrogen container, about 220 cu. ft. capacity; and three acetylene steel cylinders, 12-in. diameter and 36-in. overall

(Schedule 4922). Revere Copper & Brass, Inc., Revere Copper & Brass, Inc., Baltimore Division, 1301 Wicomico Street, Baltimore, has let general contract to H. J. Dudley, 102 West Chase Street, for one-story addition for storage and distribution. Cost about \$45,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 1 for one motor-driven thread grinder (Schedule 5886) portable gasoline engine air com-pressor (Schedule 5837), copper tubing (Schedpressor (Schedule 5837), copper tubing (Schedule 5941), precision gage and toolmaker's blocks (Schedule 5870), automatic telephone equipment (Schedule 5858), motor-driven, double-housing planer (Schedule 5819), motor-driven, overhung-type woodworking machines (Schedule 5836), motor-driven arbor tilting saws (Schedule 5900), steel flasks (Schedule 5830); until April 3, Swiss pattern files (Schedule 5838), wood boring augers (Schedule 5847); until April 4, electric crane trucks (Schedule 5851), radial engine assembly stands (Schedule 5873).

# The South

Jacksonville Shipbuilding Corp., ville, Fla., care of John M. Rice, Grant Building, Pittsburgh, engineer, is being organized under Florida laws by Pittsburgh interests to build a new shipbuilding plant at Eastport, near Jacksonville, on about 1300 acres of waterfront property. Initial plant will comprise five or more shipways, ultimate yard to have 25 shipbuilding berths, mechanical and other shops, outfitting docks, power house and other structures. Plant will be used for con-struction of vessels for Government and will cost close to \$25,000,000. Grant B. Shipley, Koppers Building, Pittsburgh, is interested in company. Engineer noted is in charge.

National Battery Co., East Point, Ga., elec-

tric storage batteries and parts, has let general contract to Robert Jenkins Construction Co., 536 North Avenue, N.W., Atlanta, Ga., for one-story addition, 40 x 120 ft. Cost close

to \$50,000 with equipment.

United States Engineer Office, Huntington, W. Va., asks bids until April 3 for new pump-ing plants at Fourpole Creek and Krouts Creek, Section 1, local protection project for

Huntington (Circular 197).

Tennessee Valley Authority, Knoxville, Tenn. plans expansion in phosphate plant at Muscle Shoals, Ala., including installation of furnaces, mechanical-handling, loading and other equipment. Cost over \$1,000,000 with machinery. Federal appropriation is being arranged.

Dayton Rubber Mfg. Co., Dayton, Ohio, automobile tires and tubes, mechanical rubber goods, etc., has asked bids on general contract for new branch mill at Hazelwood, N. C., comprising main one-story production unit and auxiliary structures, machine shop and power house. Cost close to \$100,000 with equip-

ment. Guyer & Neuffer, Ludlow Arcade Building, Dayton, are architects.

Standard Oil Co. of Louisiana, Inc., St. Charles Avenue, New Orleans, has let general contract to E. B. Ludwig Construction Co., Inc., 1350 Jefferson Highway, for new bulk storage and distribution plant at Chalmette,

La. Cost over \$90,000 with equipment.

Food Machinery Corp., Florida Division.

Dunedin, Fla., equipment for citrus fruit pack-





# The Only Triple-Insulated Batteries that give you RA. CAPACIT in the same compartment space

The wheels of industry are turning faster and faster to meet the pressing demands of National Defense. Materials of preparedness are rolling out in ever increasing quantities. These essential items must be kept moving—moving fast, to keep pace with the great National demand. Your electric trucks must carry heavier loads, work longer hours, operate steadily.

Philco Batteries give you what it takes to meet these increased requirements. 10% EXTRA CAPACITY in the same compartment space . . .

power to spare for the toughest jobs. Ample capacity to do the entire day's work at constant speed, under peak conditions. Triple Insulation insures dependable, trouble-free performance and long life ... with lowest possible maintenance cost.

• Investigate Philco Batteries now! Specify them for either your present trucks or for new electric trucks. Check your requirements with Philco Engineers; they can help you. Write:

PHILCO, Battery Division Philadelphia, Pa.

Dept. 390

ing and canning plants, etc., has let general contract to Roebling Construction Co., Clearwater, Fla., for new one-story plant near Lakeland, Fla. Cost over \$85,000 with equip-

ment. Main offices are at San Jose, Cal. Kentucky & West Virginia Power Co., Ky., has authorized appropriation of \$4 .-339,000 for expansion and improvements in power plants, power substations, transmission and distribution lines, and other facilities in Hazard, Pikeville and Ashland, Ky., districts.

Consolidated Oil Corn. Toyas City Toy Consolidated Oil Corp., Texas City, Tex., plans expansion in oil refinery, including new unit for production of lubricating oils, steel storage tanks and other facilities. Cost over 31,000,000 with equipment.

Dow Chemical Co., Midland, Mich., industrial chemicals, magnesium alloys, etc., plans addition to magnesium works at Freeport, Tex.. consisting of one and multi-story units for production for Government, which will pro-vide fund of about \$8,000,000 through Defense Corp., Washington, Federal agency.
will supplement expansion now being carried out by company at same plant. com-prising second unit for extraction of bromine from sea water and which will represent investment of about \$4,000,000

w. S. Dickey Clay Mfg. Co., New York Life Building, Kansas City, Mo., structural clay products, plans rebuilding branch plant at Texarkana, Tex., recently destroyed by fire, to include one-story buildings for raw material storage and grinding department, molding division, rotary kilns, mechanical-drying unit, machine shop and other structures. Cost over \$275,000 with machinery. Alfred Benberg, first noted address, is architect.

# Central States

• Cleveland Graphite Bronze Co., 880 East Seventy-second Street, Cleveland, bearings, bushings, etc., has asked bids for new one and two-story plant, consisting of several units of about 400,000 sq. ft. floor space, at 16800 St. Clair Avenue, N.E. Cost close to \$2.000,000 with machinery. Company will consolidate all local plants at new location and develop increased output for airplane bearings and parts John H. Graham, Hanna Building, is archi-

Cleveland Hobbing Machine Co., 1170 East 152nd Street, Cleveland, machine tools and parts, plans new one-story plant, 200 x 200 ft., with two-story office and operating building ad-joining, 25 x 200 ft. Cost over \$150.000 with equipment. Harry A. Fulton, 5716 Euclid Avenue, is architect.

General Electric Co., Lamp Division, Nela

Park, Cleveland, plans new one-story plant. 100 x 232 ft., at Conneaut, Ohio, with loading dock, 50 x 200 ft., and auxiliary structures. Cost over \$125,000 with equipment. Estate Stove Co., Hensley and East Avenues.

Hamilton, Ohio, has let general contract to F. K. Vaughn Building Co., First National Bank Building, for one-story addition, 75 x 350 ft., for storage and distribution. Cost over \$100.000 with equipment.

Upson-Walton Co., 740 Superior Avenue. Cleveland, wire rope, cable, etc., plans one-Cleveland, wire rope, cable, etc., plans one-story addition, 120 x 300 ft., for expansion in production. Present wire rope mill at Belleville, N. J., will be removed to new structure and increased capacity carried out. Bonfield & Cummings, Euclid Building, Cleveland, are architects.

Mid-West Forge Co., 17301 St. Clair Avenue Mid-West Forge Co., 17001 St. Clair Avenue.
Cleveland, steel forgings, etc., has let general
contract to H. L. Vokes Co., 5300 Chester
Avenue, for one-story addition, 75 x 95 ft.
Cost close to \$45,000 with equipment. A 40ton craneway will be extended through struc-

Moerschel Products Co., 606 Jefferson Avenue, Jefferson City, Mo., beverages, has asked bids on general contract for new one and twostory mechanical-bottling, storage and dis-tributing plant, 60 x 100 ft., and second story, x 65 ft. Cost over \$75,000 with equipment.

M. Schaper, Central Trust Building, is 50 x 65 ft. J. M. Sch architect

Chevrolet-Muncie Division, General Motors Corp., Muncie, Ind., automobile parts, plans

forge shop on West Eighth Street, about 10,000 sq. ft. of floor space. Cost over \$80,000 with equipment.

Busch-Sulzer Brothers Diesel Engine Co., 3300 South Second Street, St. Louis, diesel engines and parts, will take bids soon on superstructure for one-story addition, 120 x 270 ft. Award for foundations has been made to Smith-Cook Construction Co., 4829 Easton Avenue. Cost over \$150,000 with equipment. Ford. Bacon & Davis, 39 Broadway, New York, ar consulting

Board of Public Utilities Konsos City Kon plans expansion and improvements in No. 2 municipal power plant at Quindaro, including municipal power plant at Quindaro, including new 30,000-kw. turbine-generator unit, con-denser, high-pressure boiler and auxiliary equipment. Cost close to \$2,500,000. Burns & McDonnell Engineering Co.. 107 West Lin-wood Boulevard, Kansas City, Mo.. is consulting engineer

Fruehauf Trailer Co., 10940 Harper Aven Detroit, has let general contract to Collins Construction Co., 6138 Lemay Street, for two one-story additions, 100 x 300 ft., and 70 x 160 ft., respectively. Cost over \$175,000 with

Republic Aircraft Products Division, Republic Aviation Corp., 5914 Federal Street, Detroit, airplane parts and equipment, plans new one-story plant for production of aircraft precision parts for Government, which has authorized an appropriation of \$1,500,000 for buildings and equipment. Main office of part company is at Farmingdale, L. I. Ex-Cell-O Corp., 1200 Oakman Boulevard,

Ex-Cell-O Corp., 1200 Oakman Boulevard, Detroit, tool grinders, aircraft engine parts, etc., has let general contract to Austin Co., Cleveland, for one-story addition, 60 x 440 ft. Cost over \$400,000 with equipment.

Ford Motor Co., Dearborn, Mich., has plans for new works near Ypsilanti, Mich., for production of bomber aircraft parts for Government, including airframe assemblies and landing goars. It will be built in two sections. To ing gears. It will be built in two sections, T-shaped, 300 x 800 ft., and 400 x 1200 ft., with power house and auxiliary structures. Cost close to \$11,000,000, fund in that amount to be secured through War Department. Output will be shipped to new bomber plane plants of Government to be located at Tulsa, Okla., and Fort Worth, Tex. Rockford Screw Products Co., 2501 Ninth

Rockford Screw Products Co., 2501 Ninth Street, Rockford, Ill., has let general contract to Linden & Son, 1102 Tenth Street, for one-story addition, 58 x 375 ft. Cost over \$100,000 with equipment. Roland Wood, Melrose Park,

Ill., is architect.

Harris Hub Bed & Spring Co., 1315 Fiftyfifth Court, Cicero, Chicago, plans one-story addition, 90 x 125 ft., for storage and distribution. Cost close to \$50,000 with equipment.

W. A. Jones Foundry & Machine Co., 4401 Roosevelt Road, Chicago, power transmission machinery and parts, has let general contract to H. E. Weede Construction Co., 1515 Howard Street, for two-story addition, 75 x 92 ft. Cost close to \$65,000 with equipment. Niestadt & Love, 343 South Dearborn Street, are archi-

Stolpher Steel Products Corp., 3258 West Fond du Lac Avenue, Milwaukee, sheet metal parts for automotive service, has asked bids on general contract for one-story addition, 100x250 ft. Cost close to \$100,000 with equipment. F. F. Drolshagen, 647 West Virginia Street, is architect. Chicago Metal Mfg. Co., 2638 West Thirty-

seventh Place, Chicago, steel boxes, flanges, metal stampings, etc., has let general contract to Rune & Son, 6760 Stony Island Avenue, for one-story addition, 81 x 245 ft., for storage and distribution. Cost over \$60.000 with equipment. Cedric A. Shantz, 25 East Jackson Boulevard, is architect.

Federal Machine & Welder Co., Warren, Ohio nas awarded contract to Warren Engineering

Co. for an addition, 80 x 165 ft.

Chicago & North Western Railroad will spend \$82,325 for additions to its shops at Green Bay, Wis.

# Western States

• Moore Dry Dock Co., Oakland, Cal., has let general contract to A. T. Beckett, 366 Fortieth

Street, for one-story metal-working shop. Cost about \$75,000 with equipment.

Cadmium & Nickel Plating Co., 805 South Hooper Avenue, Los Angeles, metal plated products, has let general contract to R. ( Thorpe, 1428 South Wooster Street, West Le R. C. Angeles, for new one-story plant, 119 x 120 ft., at 1400 Long Beach Avenue. Cost over \$65,000 with equipment. Edwin F. Rudolph, 132 West First Street, is engineer.

United States Engineer Office, 751 Figue Street, Los Angeles, asks bids (no closing date stated) for power plant and electrical distribu-tion system at Wendover, Utah.

Crown-Willamette Paper Co., Camas, Wash., will take bids soon on general contract for four-story addition, 105 x 120 ft., for expan-sion in converting plant, part of structure for storage and distribution. Cost over \$100,-000 with equipment.

Rureau of Supplies and Accounts. Navy Department, Washington, asks bids until April 1 for one motor-driven, universal ram-type turret lathe for San Diego Naval Air Station (Schedule 5855).

Rohr Aircraft Corp., Chula Vista, Cal., airplanes and parts, plans one-story additions for increase in parts and assembling divisions for Government. Federal appropriation of about \$565,000 is being secured for buildings and equipment.

Municipal Lighting Department, Third Ave nue and Madison Street, Seattle, Eugene Hoff-man, superintendent, is arranging fund of about \$885,000, for expansion and improvements in plants and system, including main generat-ing station at Skagit, transmission and distributing lines, power substations and other

Pacific Pump Works, Inc., 5715 Bickett Street, Huntington Park, Cal., pumping machinery and parts, has asked bids on general contract for one-story addition, 70 x 100 ft. Cost about \$50,000 with equipment. W. M. Bostock, 6221 Pacific Boulevard, is engineer.

# Canada

· Deepwater Shipbuilding & Construction Co., Ltd., 371 Bay Street, Toronto, Ont., plans new drydock at shipyard in Toronto Harbor, in-cluding mechanical shops and other facilities. Cost close to \$1,500,000 with equipment. W. H. Mallory, 2 Kingswood Road, is consulting

Crouse-Hinds Co. of Canada, Ltd., Labatt Avenue, Toronto, Ont., electrical products, has let general contract to Ramsay Contracting Ltd 39 Indian Road Crescent, for twotory and basement addition, 46 x 115 ft. Cost close to \$75,000 with equipment. T. Pringle & Son, Ltd., 39 Toronto Street, is architect and engineer.

National Defense For Sea, Ottawa, Ont., Government agency, has let contract to Do-minion Bridge Co., Ltd., Lachine, Que., for minion Bridge Co., Ltd., Lachine, Que., for new drydock at Halifax, N. S., where a large repair plant will be established; also will build construction shops and other structures. Cost about \$2,500,000 with equipment.

Dominion Department of Public Works, Ottawa, Ont., has plans by Charles B. Dol-phin, architect, 43 Victoria Street, Toronto, for erection of naval buildings in province of Nova Scotia, to cost \$5,000,000. J. M. Sommerville, Ottawa, is secretary.

General Motors of Canada, Ltd., Oshawa, Ont., has plans by Allward & Gouinlock, 27 Bloor Street West, Toronto, architects, for an addition to plant at Windsor, Ont., to cost about \$250,000 with equipment.

Electric Auto, Ltd., Sarnia, Ont., has warded general contract to Robert McKay, 291 Milton Street, for a factory to cost \$70,000.

Noorduyn Aviation, Ltd., 1411 Crescent Street, Montreal, has awarded structural steel contract to Central Bridge Co., Ltd., Trenton. Ont., at \$109,000, for plant addition at Ville St. Laurent, Que. L. A. & P. C. Amos, 133 Commissioners Street West, are architects.

Service Stations Equipment Co., Ltd., 101 Hanson Street, Toronto, gasoline pumps, refrigerators, etc., will build an addition to cost \$40,000 without equipment.

# **Engineering facts on bethanized wire**

# HOW IT IS MADE:

Bethanized wire is zinc-coated by electrolysis. The uncoated wire enters a long tank or "cell" containing a solution of zinc sulphate. A high-density electric current flows through this solution depositing pure zinc, particle by particle, on the wire. The result is the bethanized coating—a wall of 99.9+ per cent pure zinc.

# ITS ADVANTAGES:

Bethanized wire may be wrapped around its own diameter, bent flat back upon itself, twisted into a pigtail, or drawn through dies to a fraction of its size—without loosening, flaking or harming the bethanized coating in any way.

A bethanized zinc coating is uniformly thick both along and around the wire. It is impossible to apply a spotty or lopsided zinc coating by the bethanizing process.

A bethanized zinc coating may be obtained twice or three times as heavy as a standard "double galvanized" coating.

# WHERE TO USE IT:

Use bethanized wire wherever you have a severe forming operation, or wherever corrosive conditions are particularly severe. The bethanized zinc coating will stand virtually any kind of forming without flaking or peeling. In the heavier coating weights, bethanized wire affords greater-thanaverage corrosion resistance.

# Partial list of applications:

Conveyor belting Brush handles Mattress springs Box reinforcing Baby carriage spokes Milk crate bottle divisions Clothes lines Coat hangers Vinevard wire Cot link fabric Chain link fence Pail bail wire Pump chain Woven fabric Wooden pipe reinforcing Helical springs

Write to Bethlehem Steel Company, Bethlehem, Pa. for free folder describing bethanized wire in detail.

Telephone wire



# BETHLEHEM STEEL COMPANY

THE IRON AGE, March 27, 1941-3

THE IRON AGE, published every Thursday by the CHILTON CO. (INC.). Publication office, Chestnut & 56th Sts., Philadelphia, Pa. Editorial and Executive Offices, 100 E. 42nd St., New York, N. Y. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under Act of March 3, 1879. \$6.00 a year in U. S., Canada \$8.50, Foreign \$12.00. Vol. 147, No. 13.





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- railroad rolling equipment in the U. S. is lubricated with Texaco than th any other brand.
- More tourists use Texaco Fire-Chief Gasoline than any other brand.
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- More Diesel horsepower on streamlined trains in the U.S. is lubricated with Texaco in with all other brands combined.

**B**ROACHING splined holes in this universal-joint drop forging, the chips fall off, the broach runs cool, the finish is better, with no welding, no tearing. The broach itself lasts 20% longer.

All this from the use of TEXACO SULTEX CUTTING OIL "DD."

This broaching job is typical of greatly improved results everywhere in cutting and grinding machining operations . . . using TEXACO Sultex Cutting or Soluble Oils.

The outstanding performance that has made Texaco preferred in the metal fabricating field has also made it preferred in the fields listed in the panel. Buyers in these fields are enjoying many benefits. You, too, will find important advantages when you use Texaco Lubricants and Fuels.

A Texaco Lubrication Engineer will gladly cooperate in increasing tool life in your shop. Phone the nearest of more than 2300 Texaco distributing plants in the 48 States, or write:

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FRED ALLEN in a full-hour program every Wednesday night, CBS, 9:00 E.S.T. 8:00 C.S.T., 10:00 M.S.T., 9:00 P.S.T.

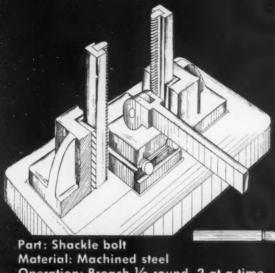
METROPOLITAN OPERA every Saturday afternoon, NBC. See local newspaper for time and station.



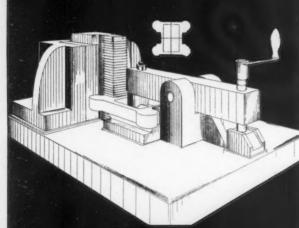


**TEXACO** Lubricants METAL-CUTTING COOLANTS

# BROACHING PAYS



Part: Shackle bolt
Material: Machined steel
Operation: Broach ½ round, 2 at a time
Production: 160 per hr
(Former rate by milling: 50 per hr)



Part: Spring chair
Material: Rough malleable casting
Operation: 1. Broach slot sides
2. Broach slot opposite sides
Production: 60 pcs. per hr

(Former rate by milling: 15 per hr)

with different FIXTURES

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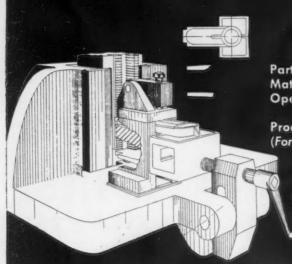
tion

processes 7 different PARTS in 60 different SIZES

Job-lot processing by broaching is profitable. Both initial cost of equipment and cost of processing can be reduced compared with milling—with the added advantage of increased productive speed, so important these days when productive facilities are heavily taxed.

In one well known plant, a single Colonial Utility type Press of 15 ton capacity and 36 inch stroke has supplanted milling machines for processing—

- (1) Seven different trailer parts, in
  - (2) Sixty various sizes, in
    - (3) Job lots usually ranging from 300 to 1000 parts, at
      - (4) One-fourth the previous processing cost per piece, and
        - (5) With an initial equipment cost of onefourth of former milling machines including the necessary fixtures, at
          - (6) Three to four times the former productive rate per hour, including change-over time.

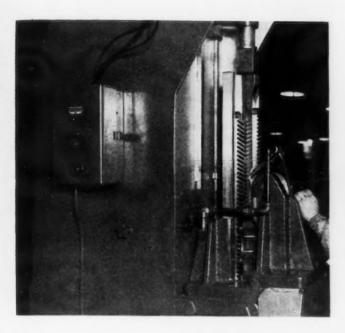


Part: Auxiliary spring chair Material: Rough malleable casting Operation: Broach both sides upper and lower arms in one pass Production: 45 per hr (Former rate by milling: 14 per hr) COLONIAL BROACH COMPANY

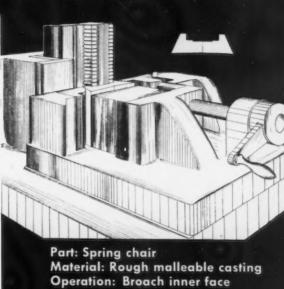
> 147 JOS. CAMPAU DETROIT, U. S. A.

# FOR JOB-LOTS TOO

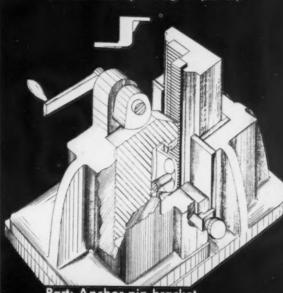
Yes, broaching machines are both high-production and flexible job-lot tools. For different parts, only the fixtures need be changed. The design of the platens, columns, beds are such that quick replacements can be made, -insuring minimum set-up time.



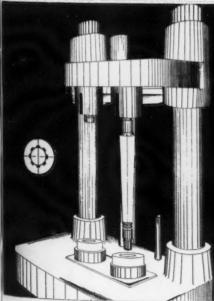
When small lots in a variety of forms or sizes must be processed quickly and inexpensively, Colonials with the right fixtures are proving the answer. Colonial has a corps of engineers at your service, and welcomes the opportunity of applying their specialized knowledge of job-lot production problems to your machining requirements.



Production: 45 per hr (Former rate by milling: 14 per hr)



Part: Anchor pin bracket Material: Rough malleable casting Operation: Broach two faces Production: 50 per hr (Former rate by milling: 10 per hr)



(Left) Part: Slack adjuster gear Material: Machined steel

Operation: Broach internal splines, 2 pcs.

at a time

Production: 200 per hr

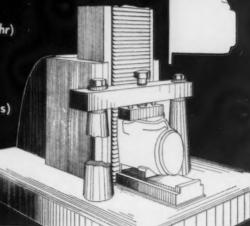
(Former rate by single pull broach: 50 per hr)

(Right) Part: Gear housing Material: Malleable iron casting

Operation: Broach 2 faces (2 passes)

Production: 40 per hr

(Former rate by milling: 10 per hr)











LIS-CHALMERS PUMP UNITS

# "ALL-IN-ONE"

# Electribugal PUMP UNIT

ALL-IN-ONE! Motor and Pump Designed as Single Unit on One Shaft and One Housing...for Increased Flexibility and Efficiency!

SPECIAL MOTOR! Yes! a New Allis-Chalmers Lo-Maintenance Motor was Especially Developed for the Problems of Pumping. This Means Lower Power Costs... Greater Efficiency!

SPLASH-PROOF! Air Passages are Baffled. Motor is Safeguarded from Liquids.

FEWER PARTS! Fewer Parts to Wear ... Better Fit to Parts ... Longer Life!

STABILITY! Rigidity of All-in-One Design and Wide-spread Feet Means Less Vibration . . . Lower Maintenance . . . More Years of Service.

EXTRA-VALUE! Indestructible Rotor . . . Distortionless Stator . . . Bronze

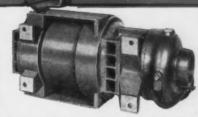
Fitted Pump Parts . . . Large Space for Adjusting Glands — Extra-Value Features at No Extra Cost!

# What Do You Want In The Pump You Buy?

It was to give you the moneysaving answer to this question, that Allis-Chalmers pump engineers designed and built the NEW "All-In-One" Electrifugal Pump Unit!

Here's a special motor-and-pump combination on one shaft and one housing that beats all records for easy installation . . . efficient operation . . . and low-cost pumping!

If that's the kind of pumping service you're looking for, here's the pump for you! For full details, call the district office near you . . . or write Allis-Chalmers, Milwaukee, Wisconsin!



IN THIS UPSIDE-DOWN VIEW OF the Electrifugal Pump, see how the air goes in and out through large air passages, keeping the motor cool and yet splash-proof.



less, removable Stator is one of the many outstanding features.



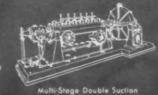
INDESTRUCTIBLE ROTOR IS ON the same shaft with pump runner—making a single unit of pump and motor . . . with lower maintenance and longer life.

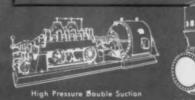


THE ALLIS-CHALMERS ELECTRIFugal Pump has bronze runner wear rings, water seal ring, and shaft sleeve . . . has been designed to deliver maximum gallons at minimum cost.











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YOUR

R PUMPING COSTS

# Announcement...

FOR THE FIRST TIME IN WELDING HISTORY



# G-E ELECTRODE LABELS NOW TELL YOU

- 1. The linear footage of welded joint obtainable
- 2. The weight of deposited metal obtainable

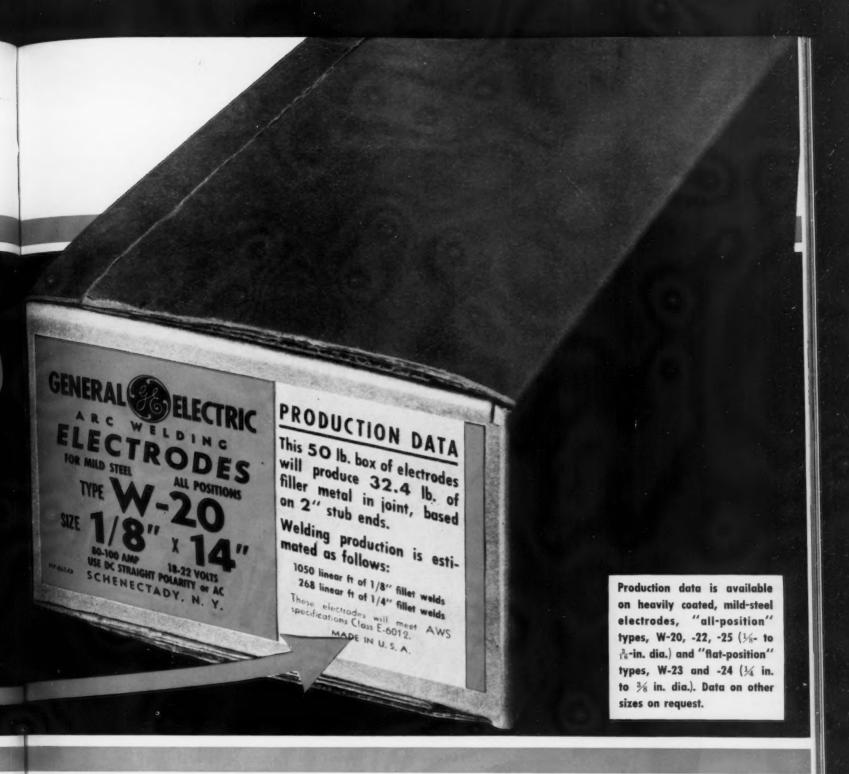
ITH this production data right on the box where it can't be lost, welding supervisors can easily estimate rod requirements and electrode costs on any job they figure, whether it involves a box or a carload! This production data—on 50-lb boxes of G-E mild-steel electrodes—is a new G-E service to the welding industry. It is backed by actual shop practice and sound, exhaus-

In these days of high-pressure production, it is imperative that you *know*—not guess—your material requirements

tive studies recently completed by G-E engineers.

and material costs, if you would get the maximum profit from every job. To help plan and estimate these needs more accurately, use G.E.'s "production-labeled" electrodes.

Welding supervisors and foremen can now assure their shops a constantly fresh, adequate supply of electrodes. Knowing the estimated welding footage possible from every type and size of rod they use, or plan to use, purchasing agents can now co-ordinate deliveries with known future requirements.





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GENERAL (28) ELECTRIC



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# Roller Bearings Stopped

# ...since using TYCOL GREEN CAST GREASE"

"Tycol Green Cast Grease never leaves a soap or foreign deposit in the bearings," was the way a lubrication engineer explained its advantages. "Gone is the worry over delays and costs caused by the former grease when it separated within the roller bearings. Tycol Grease products resist breakdown in structure, thus assuring maximum lubricating value."

This operator knows also that Tycol Green Cast Grease gives better protection and more effective lubrication. It's because this modern grease is made from a paraffine base cylinder oil combined with a minimum of soap. More oil—less soap—means better, more economical lubrication.

Speed up production—avoid the delays of ineffective lubrication. Tide Water makes a line of greases and oils "scientifically engineered to fit your needs"—engineered to maintain efficient performance wherever wheels, gears, and shafts turn. Cooperation from our engineers is freely offered.

Regional Offices: Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

# TIDE WATER ASSOCIATED OIL COMPANY

EASTERN DIVISION

17 Battery Place . New York, N. Y.

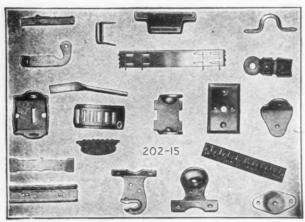


# BAIRD AUTOMATIC PRESSES . . .

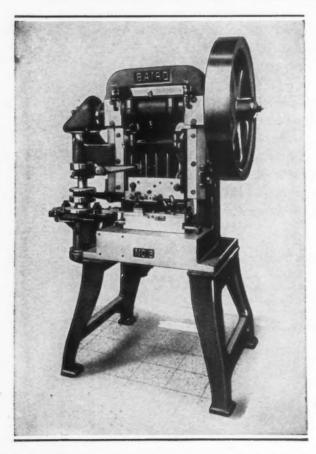
Herewith are shown two types of Baird Automatic Presses for large quantity production. The one to the right is a Standard Heavy Single Action Open Back Press with readily removable and readily attachable automatic attachments, in this instance a single station transfer.

Many manufacturers using automatic machines elsewhere in the shop are overlooking the benefits of the automatic principle in their press departments. For constructive suggestions leading toward betterment of press production we invite such manufacturers to

"Ask BAIRD About It"







# AUTOMATIC MULTIPLE TRANSFER PRESSES

The latest of the many Baird achievements is the Automatic Multiple Transfer Press for the automatic production of articles from the coiled material.

Transfer fingers not only transfer the blank to various stations, but they also retain their grip until the punches make contact.

Machines have been arranged with different types of feeding mechanism, strokes for slide, stroke for transfer to best suit the article to be made.

All punches have independent adjustments. The punches, dies, transfer slide and fingers constitute a unit which may be removed from the press in a very few minutes. This important feature eliminates time-consuming tool set-ups when changing over from one job to the next.

Over 60 years of Baird engineering skill and experience are embodied in this new Automatic Multiple Transfer Press which is built in six sizes to take strips  $1\frac{1}{2}$ " to 6" in width. Get the full details of this new development.

"Ask BAIRD About It"

THE BAIRD MACHINE COMPANY

BRIDGEPORT, CONN.

# Your Assurance of DEPENDABLE High Quality



To users of Tin Plate, the WEIRITE trademark means assurance of *dependable* high quality . . . quality not only *maintained* on every order but also *constantly* improved to anticipate changing needs.

For WEIRITE users, this product superiority is smoothing the road to profits . . . is opening new avenues to more business . . . is lifting operating efficiency to new high levels. And for the makers of WEIRITE, it has meant preeminence as the world's largest independent tin plate producer.

Enjoy the fullest measure of "profit-satisfaction" when you buy tin plate. Know in advance that the *dependable* quality you want is really there, Specify WEIRITE.

### LIST OF PRODUCTS

Bars... Angles... Structurals... Piling... Hot and Cold Rolled Strip... Hot and Cold Rolled Sheets... Galvanized Sheets... Long Terne Sheets... WEIRITE Cold Reduced Tin Plate... Terne Plate—Special Coated and Roofing Ternes... Tin Mill Black Plate... Lacqured Tin Plate and Black Plate.

# WEIRTON STEEL COMPANY—WEIRTON, WEST VIRGINIA

Sales Offices in Principal Cities

division of



# NATIONAL STEEL CORPORATION

Executive Offices, Pittsburgh, Pa.



In this emergency, rapid firing guns, fast flying planes, demand corresponding speed and reliability in the production of their parts. And here is where the firm that can produce quality quickly shows its true worth. Here in Bristol, we've spent years building quality... and the equipment to produce it accurately and speedily in the form of springs. Here is our line of offense for national defense:

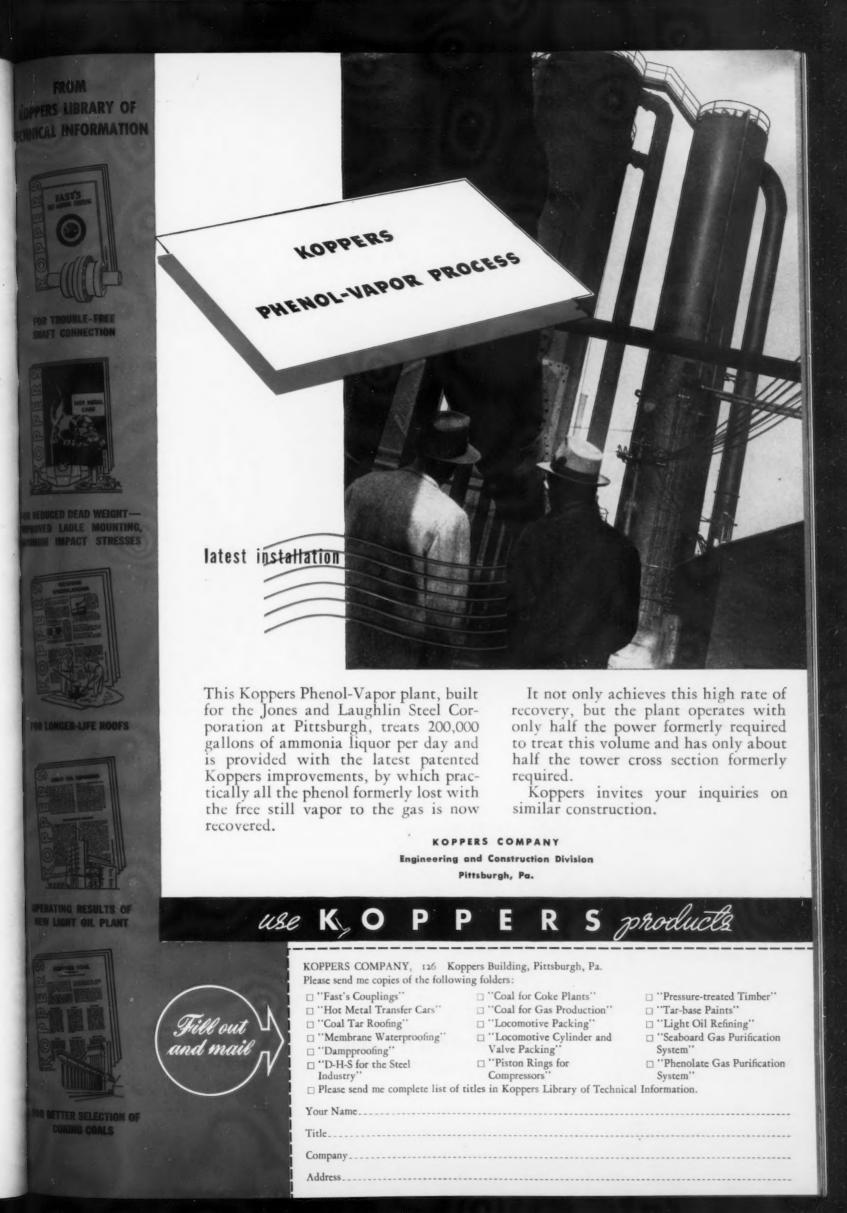
- \* A Production Line for shipment of springs in large or small quantities to meet your production line requirements.
- \* A Production Line of heat-treating equipment, batch type and continuous, with carefully controlled atmospheres.
- \* A Production Mill producing unexcelled cold-rolled spring steel.
- $\bigstar$  Time-trained craftsmen...whose life calling is springmaking.

For American Products

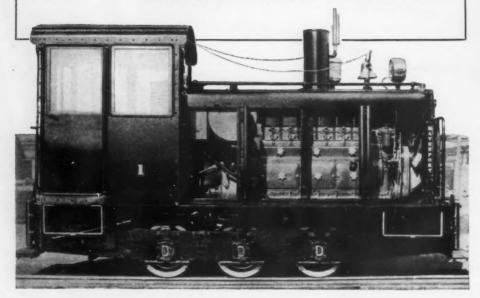
# Barnes-made Springs

and Spring Steel

WALLACE BARNES CO., BRISTOL, CONN., U. S. A. DIVISION OF ASSOCIATED SPRING CORPORATION



# In the News WITH BANTAM BEARINGS



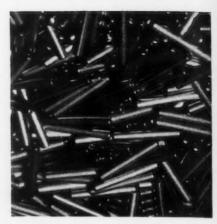
**UP-TO-THE-MINUTE LOCOMOTIVE** of the industrial type is this unit designed and built by Davenport Besler Corp. for hauling sugar-cane in Puerto Rico. Locomotive replaces steam unit previously used, is powered by 6-cylinder Fairbanks-Morse Diesel engine. Bantam Quill Bearings, used on the wrist pins of the Diesel, are the recognized standard for this service, where their small size and high capacity in oscillating loads are outstanding advantages.



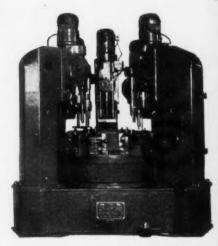
LOGGING OPERATIONS in rough, hilly country put towing equipment to the severest test. Willamette Hyster Co. improves efficiency, lengthens service life of its HYSTER D2 Towing Winches by using Bantam Quill Bearings on idler gear and reverse idler gear—where space is so limited that no other type of anti-friction bearing could be successfully employed. Moreover, the Quill Bearing is low in cost and easy to install. For further information on this compact, high-capacity bearing, write for Bulletin M-104.

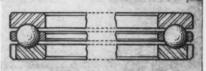


THIS GIANT ROLLER BEARING has a radial capacity of 225,000 pounds at 100 RPM, uses 125 rollers 1" long and 1" in diameter. It is one of a group specially engineered by Bantam for use by Ohio Oil Company in central station pumping equipment, to provide high radial capacity and reduce need of servicing.



BANTAM'S NEEDLE ROLLERS can be assembled into anti-friction bearings of exceptionally high capacity in proportion to size and cost. Bantam's metallurgical processes provide the hardness necessary for maximum capacity, yet retain needed ductility. Needle Rollers round out Bantam's line of anti-friction bearings—straight roller, tapered roller, self-retained needle, and ball.





6-STATION DRILLING MACHINE built by The Bradford Machine Tool Company turns on Bantam indexing table bearing of the ball thrust type, measuring 30" O.D., 27" I.D., 2" thick. Here is another typical instance of the way Bantam serves industry with custom-built bearings in large sizes or special types. If you have an unusual bearing problem, TURN TO BANTAM.



BANTAM BEARINGS CORPORATION . SOUTH BEND . INDIANA



e their small size

DR. EDWARD GOODRICH ACRESON WHOSE CENTUS IN CREATING THE INVENTIVE FIRST MAN-MADE GRINDING MATERIAL GAVIE SUCH IMPETUS TO THE DEVELOPMENT OF ABRASIVE PRODUCTS THAT THEY HAVE BECOME ALL IMPORTANT FACTORS IN MAKING POSSIBLE VASTLY INCREASED

d HindPRODUCTION PRECISION The control of the senting of the continue of the control of the c THROUGHOUT ALL INDUSTRY

ostom-built bearings in large special types if you man problem, TURN TO BANTAN

ROLLERS can be assemb a bearings of exception proportion to size and c

up to your Moreover, the Quill Bearing is low it need and easy to Install. It is further infor-cation on this compact, first careafty bear as write for Holletin W. 104.

Never before in history has life been so enriched by scientific discovery and industrial progress as in the half century just comleted. We have seen amazing strides in means of transportation .. the automobile, the airplane, the streamlined train of stainless steel. The electric furnace has given fadustry new chemicals, new steels, new allow. We have witnessed the creation of new synthetics, the perfection e machine tool, the enormous development of mechanical efficiency in every countless commodities that promote and protect our way of life.

Of all these varied advances none sur the progress made in the abrasive held. When Dr. Edward Goodrich Acheson created the first man-made abrasive fifty years ago, little did he foresee that modern abrasive products would become one of industry's most important tools for the shaping, grinding and finishing of almost every device of the useful arts. It shape the massive casting. It grinds tons of wo e tiny balances of our watches. It smooths od pulp for paper making. It fashions marble her and sharpens the tools of every cr

structure of industrial life ... meeting its fundamental needs, furthering its progress, translating vesterday's luxuries into today's commonplace necessities.

It is with justifiable pride, therefore, that we of The Carborundum Company pay tribute to the late Dr. Edward Goodrich Acheson in commemorating the Fiftieth ain Anniversary of his creation of silicon carbide, trade named "Carborundum", the first ance means which creation of silicon carbide, trade named "Carborundum", the first ance means which is the same and some silicon carborundum. man-made abrasive. It is fitting also that we choose this occasion to acknowledge mi the splendid cooperation of our friends in industry in bringing his work to fruition and to rededicate this Company's efforts to a continuing service to industry and to the betterment of America's ection units." It's all done in a few seconds afile or yew

FRANK J. TONE, President,

THE CARBORUNDUM COMPANY,

NIAGARA FALLS, N. Y.



# -"INSURED" FOR LONG LIFE BY DYNETRIC BALANCING MACHINES

• How long these armatures deliver efficient service will depend largely upon their proper static and dynamic balance. For, in any high-speed rotating part—from diesel locomotive generators to the tiny rotor in your electric razor—unbalance means vibration, excessive wear, and shorter life. The best "insurance" against it is proper balance.

This fact has long been known to manufacturers. But until recently, accurate balancing was a costly, time-consuming operation. Now, the new Gisholt Balancing Machines enable you quickly to locate and measure unbalance in terms of practical "correction units." It's all done in a few seconds—detecting unbalance vibrations as small as .000025".

GISHOLT MACHINE COMPANY
1215 East Washington Avenue • Madison, Wisconsin



How Gisholt Balancing Machines provide quick, accurate balancing for many different sizes and types of parts is explained in an interesting, new 30-page bulletin. Your copy will be sent on request.



Look Ahead . . . Keep Ahead . . . With Gisholt Improvements

TURRET LATHES . AUTOMATIC LATHES . BALANCING MACHINES

# PARSONS WHITE BRASS

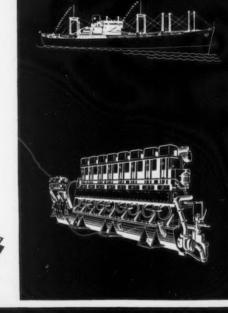
FOR YOUR ENGINE BEARINGS



• Parsons' White Brass D. A. was developed especially for bearings of Diesel and turbine engines. The same qualities which make it successful in this service also make it one of the best bearing metals for gasoline engines, generators, paper and pulp mill machinery, and printing presses.

Virgin metal of the highest quality and strict metallurgical control insure satisfaction in service.







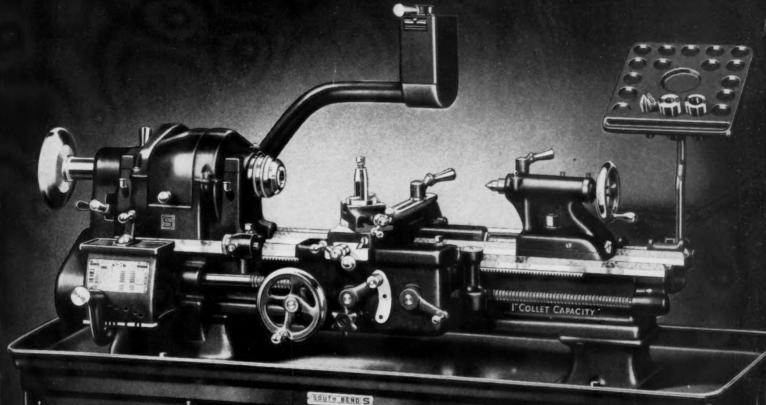
# CRAMP BRASS & IRON FOUNDRIES

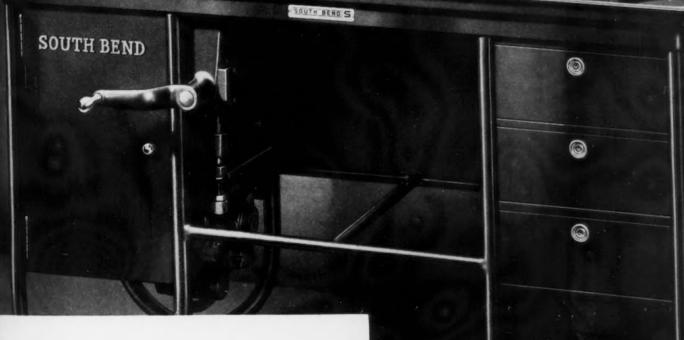
DIVISION OF THE BALDWIN LOCOMOTIVE WORKS

Other Members of the Baldwin Group • THE BALDWIN LOCOMOTIVE WORKS
BALDWIN SOUTHWARK DIVISION • THE PELTON WATER WHEEL COMPANY
BALDWIN DE LA VERGNE SALES CORP. • THE WHITCOMB LOCOMOTIVE COMPANY
THE MIDVALE COMPANY • STANDARD STEEL WORKS DIVISION

# SOUTH BEND LATHES

for precision machine work





This is the new 10" swing 1" collet capacity South Bend Underneath Belt Motor Driven Precision Tool Room Bench Lathe. South Bend Lathes are made in five sizes: 9", 10", 13", 14½", and 16" swing, with various types of drives.

# SOUTH BEND LATHE WORKS

LATHE BUILDERS SINCE 1906

668 E. Madison Street, South Bend, Ind., U.S.A.



# "ON THE SUR FACE" utation for highest quality plate steel has long been established, are regular users of Ferro-Carbon Titanium. Reports indicate that yield is usually increased and finished products have better "surfaces" with fewer defects when Ferro-Carbon Titanium is used as final cleanser and deoxidizer. Write for data on its specific uses in steel. TITANIUM **ALLOY MANUFACTURING COMPANY**

GENERAL OFFICES AND WORKS: NIAGARA FALLS, N. Y., U. S. A. EXECUTIVE OFFICES: 111 BROADWAY, NEW YORK CITY

 "We believe in and are supporting America's Defense Program

# Years after

has succeeded

The AETNA-

STANDARD

ENGINEERING COMPANY
\* YOUNGSTOWN, OHIO, U.S.A. \*

Designers and Builders to the Steel, Non-ferrous and Chemical Industries

# How Zirconium eliminates porosity in High-Chromium **Steel Castings**

THE ADDITION of zirconium to low-carbon steels of the 4 to 6 per cent and 12 to 14 per cent chromium types has been found to eliminate pinholes and shrinkage cavities in sand castings of these steels. The zirconium in the form of 35 to 40 per cent zirconium alloy is added as a final deoxidizer following normal deoxidation with manganese and silicon. The result is clean, sound castings with excellent physical properties.

Ask to have one of our metallurgists call and explain further how you can improve your high-chromium steel castings with zirconium. He will also gladly tell you about other "Electromet" ferro-alloys that may be useful to you. This service will not obligate you in any way.

# **ELECTRO METALLURGICAL COMPANY**

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street

New York, N.Y.



Blowholes and shrinkage cavities in a 12 to 14 per cent chromium steel casting not treated with zirconium. Magnification -250 diameters.

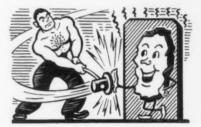


A 12 to 14 per cent chromium steel casting treated with 35 to 40 per cent zirconium alloy, showing the cleanliness and freedom from cavities. Magnification-250 diameters.

# Items of Interest about other "Electromet". Ferro-Alloys

High-Nitrogen Ferrochrome Improves High-Chromium Steel Castings-High-nitrogen ferrochrome adds both nitrogen and chromium to steel. A small per cent of nitrogen in cast steels containing over 20 per cent chromium greatly refines grain size, inhibits objectionable grain growth at high temperatures, materially increases strength and toughness and effects a slight increase in

Columbium Increases Usefulness of 4 to 6 Per Cent Chromium Steels - The addition of about 0.50 per cent columbium to the



wrought 4 to 6 per cent chromium steels greatly reduces air-hardening, gives higher impact strength regardless of heat-treatment or temperature. improves oxidation resistance, increases creep strength, and improves weldability. Therefore, columbiumbearing 4 to 6 per cent chromium steels have a greatly widened field of usefulness.

If you want more information about these and the many other "Electromet" ferro-alloys and metals and the service that goes with their purchase, write for the booklet, "Electromet Products and Service."

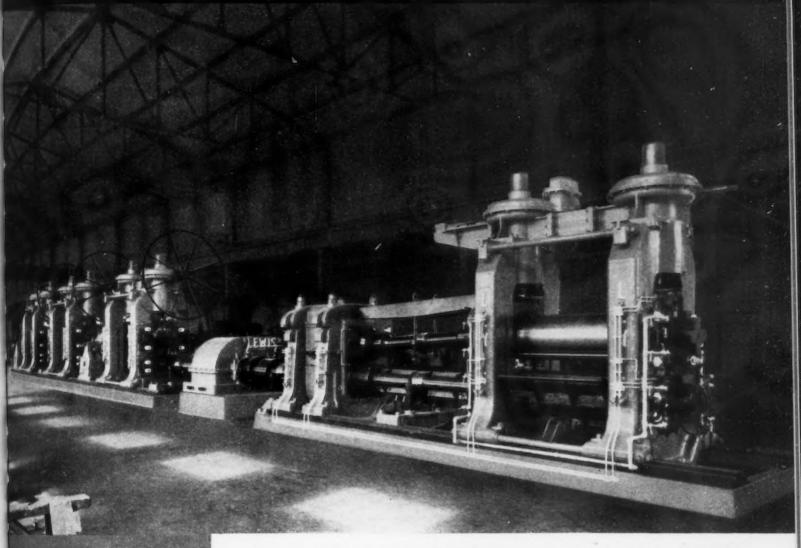
# **Electromet**

Ferro-Alloys & Metals

Available through offices of Electro Metallurgical Sales Corporation in Birmingham, Chicago, Cleveland, Detroit, New York, Pittsburgh, and San Francisco. In Canada: Electro Metallurgical Company of Canada, Ltd., Welland, Ont.



# LEWIS ALUMINUM ROLLING MILLS



LEWIS ROLLS

STEP UP TONNAGE One hot and three cold Aluminum Mills,  $26'' \times 62''$ , driven from a common gear drive, equipped throughout with Lewis alloy iron rolls.

The hot mill is driven from gear drive and pinion stand through universal spindles, and is equipped with motor operated worm driven screwdowns.

Both hot and cold mills are furnished complete with fore plates and strippers and complete automatic lubrication.

The cold mills have hand wheel operated screws through worms and worm wheels with provision made for future motors so that any one of the cold mills can be readily converted into a hot mill with a change in rolls.

Two top roll drives are used to supply power to the three top rolls of the cold mill.

Machinery for lower production costs is developed at Lewis. Experienced engineers, capable of understanding and solving your problem, are at your disposal.

LEWIS FOUNDRY & MACHINE

PITTSBURGH, PA.



IN UTILITY TRAILERS, TOO . . .

# COR-TEN in stress-carrying members keeps bigger payloads rolling

"UNLESS otherwise specified U·S·S COR-TEN is standard construction for body framing and all stress-carrying members," says H. C. Bennett, Utility's General Manager.

"In the more than 300 Cor-Ten steel bodies now in highly successful operation, weight saving by the use of Cor-Ten has enabled us to produce equipment that is both lighter and stronger. Because Cor-Ten has tremendous strength and elasticity which greatly increases resistance to 'metal fatigue,' such construction insures long life and uninterrupted service. We have found these Cor-

TEN bodies operate economically, free from the need of repair far longer than bodies of ordinary construction."

Does lightweight construction with Cor-Ten stand up? Listen. Do you know what racks the life out of heavy-duty equipment like this? Vibration and twisting stresses, of course. Cor-Ten has an amazing ability to absorb them. For in addition to its high yield strength, Cor-Ten has 66.6% greater resistance to fatigue than plain structural steel. Its endurance limit is more than twice that of non-ferrous "light" metals. That's why Cor-Ten imparts

a lasting ruggedness and extra stamina that keeps hard-working equipment on the road.

You don't have to pay a premium for the extra advantages that Cor-Ten construction offers. When used correctly, not just as a substitute for plain steel but as an integral factor in lightweight design, Cor-Ten will cut hundreds of pounds from trucks, trailers and buses, with little or no increase in cost and without the sacrifice of a single advantage previously enjoyed.

We'll be glad to show you how to apply U·S·S Cor-Ten most economically to your designs.

# U·S·S HIGH TENSILE STEELS

AMERICAN STEEL & WIRE COMPANY, Cleveland, Chicago and New York
CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh and Chicago
COLUMBIA STEEL COMPANY, San Francisco
NATIONAL TUBE COMPANY, Pittsburgh
TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham

Scully Steel Products Company, Chicago, Warehouse Distributors



United States Steel Export Company, New York

UNITED STATES STEEL



# SPEEDY • ECONOMICAL • ACCURATE

A new TOCCO Utility Junior (20 KW output), smaller in size and lower in cost, is now available. Ideal for use in plants where installation of more elaborate heat-treating equipment is not warranted. It provides fast, economical operation for treatment of small parts in small runs. A self-contained, efficient machine, easy to install.

For annealing, brazing, soldering, heating FOR TOCCO HEATING for forming and forging. All-metal cabinet encloses high frequency motor generator set (9600 cycles), standard TOCCO controls, air filters, welded steel base and other TOCCO features. Unit is waist high-3'x4'. Write for details of Model 20 SC MG 10.

Accurate, one-station unit for TOCCO-FOR TOCCO HARDENING hardening of small parts. Hardens at wearing surfaces only with depth and degree of hardness closely controlled. Transformer housing with rotatable transformer panel, and work pan are added to the basic 20 SC MG 10 machine. Has high frequency motor generator set (9600 cycles), pre-set, full automatic controls, quench and cooling water valves and other proved TOCCO features. Floor space-3'x 4'. Only water and power connections are necessary for installation. An efficient, easy-to-operate machine that cuts costs. Full details on Model 20 ST MG 10 will be sent on request.

See the new TOCCO Utility Junior in operation at the A. S. T. E. Machine & Tool Exhibition, Space 202, Detroit



THE OHIO CRANKSHAFT COMPANY

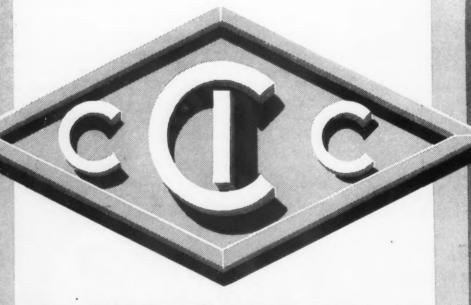
Cleveland . Ohio

"Why Heat Treat the Whole Piece?"

Miners and Shippers of
Lake Superior Iron Ores

Vessel Transportation
on the Great Lakes

Coal for Industrial and
Domestic Use



THE CLEVELAND-CLIFFS IRON CO

UNION COMMERCE BLDG. - CLEVELAND, OHIO

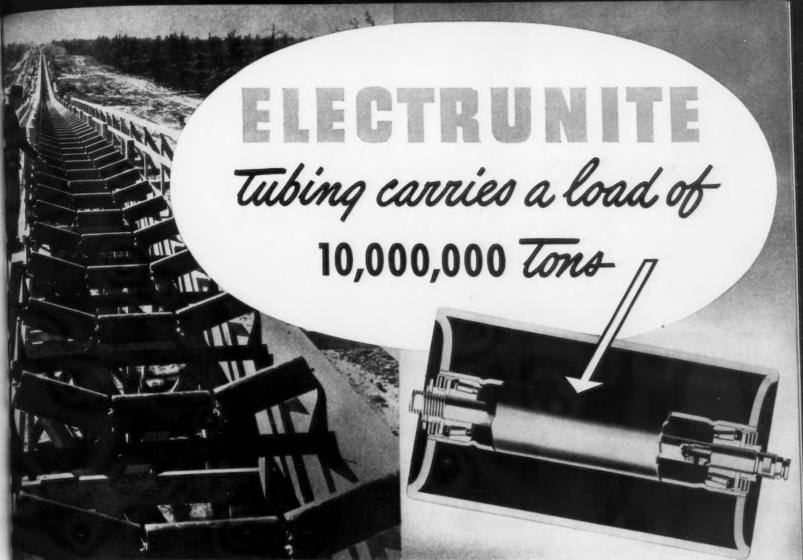


Photo-U. S. Bureau of Reclamation

Up and down, twice across the Sacramento River, over six roads, across four creeks and a railroad runs the longest belt conveyor system ever installed. And over the 9.6 miles of this conveyor, reaching from Redding to Coram, California, and operating at 550 feet per minute, will pass an estimated 10,000,000 tons of aggregate for the concrete construction of mighty Shasta Dam.

More than 16,000 idler rollers were required—and the inner tubing of every idler, as shown in the cutaway illustration, is Republic ELECTRUNITE Electric Resistance Welded Tubing. The outer shell, incidentally, is Republic Pipe made by the same process.

Does this application give you an idea? Is there some part of your product where this uniform, easy-to-fabricate tubing will help to increase strength,

reduce weight, lengthen life, improve appearance or reduce fabricating costs?

While considering your uses for tubing, remember these features of ELECTRUNITE: (1) high strength with a weld as strong as the wall; (2) consistent uniformity in diameter, wall thickness, concentricity, ductility and smooth surface finish; (3) availability in carbon and stainless steels, in a full range of sizes and in various shapes.

We'll gladly send detailed information—and Steel and Tubes engineers will offer suggestions and advice, if you desire. Write Steel and

Tubes Division, Republic Steel Corporation, Cleveland, Ohio—world's largest manufacturer of steel and ferrous alloy electric resistance welded tubing.

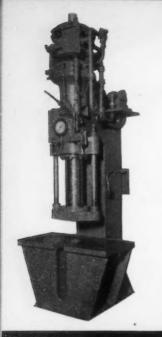


REPUBLIC

REG. U. S. PAT. OFF

# ELEGIBUNITE

ELECTRIC RESISTANCE WELDED TUBING
Also Boiler Tubes · · · Condenser and Heat Exchanger Tubes



30 TON CAPACITY



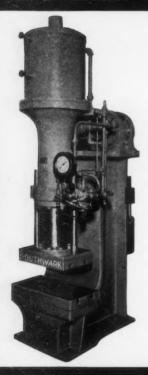
75 TON CAPACITY



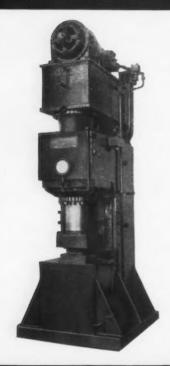
ENGINEERING OK

PATTERNS

DUPLICATE
SHOP ORDER NO. 90-728



80 TON CAPACITY



150 TON CAPACITY



260 TON CAPACITY



1000 TON CAPACITY

Here are a few of the dozens of modern gap-type presses built by Southwark in the past few years.

It takes time to design a press, sometimes weeks to make the patterns. Southwark has designed and built hundreds of presses, has countless up-to-date patterns in storage.

Now, when every week saved on delivery is vitally important, you can profit by specifying a

press with all this preliminary work done.

Drop us a note and outline your requirements. Chances are a Southwark engineer can show you a ''stock'' press to meet them.

Baldwin Southwark Division, The Baldwin Locomotive Works, Philadelphia, Pacific Coast Representative, The Pelton Water Wheel Co., San Francisco.

Baldwin Southwark

DIVISION OF THE BALDWIN LOCOMOTIVE WORKS

PHILADEL PHIA

# 12000 Bolts per Grind is real Performance



APACITY

and that is exactly how a midwestern manufacturing company feels about its Landis Automatic Forming and Threading Machine.

The vice president of this company writes — "We feel that you should know how well pleased we are with our Landis Automatic Forming and Threading Machine."

"We are securing excellent production with a very small amount of down time for die changes, etc. Die life is excellent."

The company referred to manufactures pole line equipment. The Landis Automatic Forming and Threading Machine in this plant is used to thread  $\frac{7}{8}$ " diameter hot forged machine bolts. The length of the threads is 2" and the thread must be held to class No. 2 specifications.

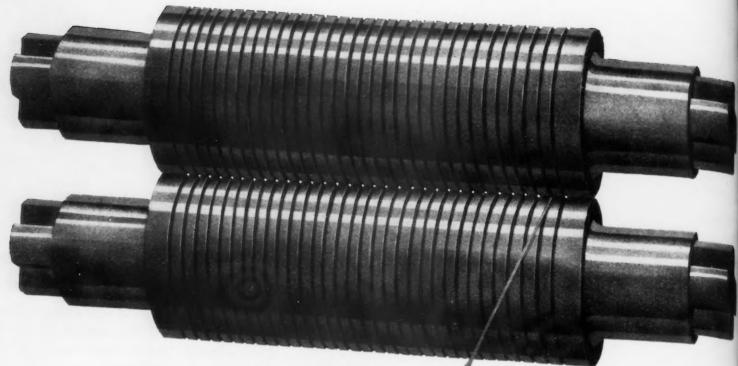
Operating at a cutting speed of 50 feet per minute, the Landis Automatic Forming and Threading Machine points and threads 570 bolts per hour. The average production per grind of the chasers is more than 12,000 bolts.

Such performance assures low tool cost and guarantees the ability of the Landis Automatic Forming and Threading Machine to meet modern production requirements.

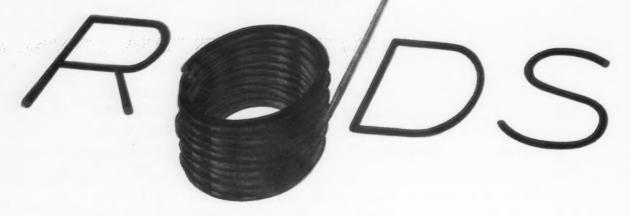
Send for our Bulletin No. E-70 today

LANDIS MACHINE CO.
WAYNESBORO, PENNA.





LESS COST PER TON OF STEEL ROLLED



Pittsburgh Rolls are important factors in stepping up production and reducing costs.



PITTSBURGH ROLLS

PITTSBURGH ROLLS DIVISION of BLAW-KNOX CO.—"Steel's Partner" . PITTSBURGH, PA.

# Informat

KEEP POSTED ON

Circle as many free booklets as you require on one of the post cards. No postage — no obligation. If you want information on products advertised in this issue—indicate the page numbers on this card.

## (1) Heating Equipment:

Information on laboratory heating equipment, including furnaces, hot-plates, rheostats and pyrometers, is given in catalog No. 40. Element of hot-plate itself serves as work-supporting top, affording quick contact heating and economy. Resistor temperatures are said to be low due to unbaffled release of heat. Cooley Electric Mfg. Co.

## (2) Lifts, Elevators:

Production lifts for the raising of materials to a level line of travel are described in leaflet. Typical installations are shown and advantages described. Basic design is said to be simple, making initial cost and upkeep low. Diversified platform styles make lift applicable to many uses. Globe Hoist Co.

## (3) Degreasers:

Portable degreasers for removal of oil and grease from all types of metal, simply and economically, without labor or mechanical action, are described in small folder. A non-inflammable fluid is used. About 10 gallons of solvent will clean from three to six tons of work, depending on type of material cleaned. Installation consists of plugging-in at an electrical outlet. Phillips Mfg. Co.

Centrifugal, geared and vane type pumps for circulating or transferring liquids, supplying lubricant or coolant, and hydraulic installations are described in 23-page catalog. Charts show performance of four types of pumps working with lubricating oil of given viscosity. Representative installations are shown. Brown & Sharpe Mfg. Co.

000

## (5) Tantalum Heaters:

(5) Tantolum Heaters:
"Tantalum Heaters for Acid Solutions" is title of 20-page booklet describing and illustrating nine different types of tantalum heaters, heat exchangers and cooling units. Table showing the resistance of tantalum to some of the more common reagents, data on the heating capacity of tantalum heat transfer equipment and suggestions for installation and care of tantalum equipment are included. Fansteel Metallurgical Corp.

## (6) Refractories:

Ramtite, refractory for foundries, combining long life, low net cost and ease of installation, is discussed in eight-page bulletin. A high heat-duty firebrick in plastic form with the consistency of putty, the refractory is ready to be pounded into a monolithic lining. Great strength and little drying shrinkage are among features stressed. Ramtite Co.

## (7) Chain Drives:

Fractional hp. silent chain drives are subject of folder No. 1894. Hp. per in. of chain width, pitch diameter of wheels and list prices of chains and wheels are given in tabular data. Drives on cameras, machine tools, blowers, etc., are among installations listed. Range of speed reductions is said to be as great as 15 to 1. Link-Belt Co.

(8) Pyrometers:
All information needed to check thermocouple pyrometers is listed in 28-page catalog. Portable equipment for plant test under actual operating conditions and laboratory apparatus for standardization is illustrated and described. Recommendations for selection of proper equipment are included. Leeds & Northrup Co.

### (9) Portable Tools:

Sectional diagrams, construction details and general information on high cycle portable electric tools for industrial applications are contained in large catalog. Tools are said to feature concentrated power, light weight, sturdy construction and ease of handling. Black & Decker Mfg. Co.

## (10) Honing Machines:

Precision honing machines for small and medium-sized parts are shown in folder. Four operations are said to be accomplished in one process: substantial stock removal, uniform diameter size within low tolerance, fine dimensional accuracy and any desired degree of planar accuracy. Micromatic Hone Corp.

#### (11) Electric Hoists:

Unit construction plan for electric hoists permitting user to specify the type of standard mechanism best suited to his operations from each of four units is discussed in booklet. Plan includes suspension, hoisting, motor and control units. Any standard mechanism in one unit may be combined with any one of another unit. Plan is diagrammed and illustrated. Reading Chain & Block Corp.

## (12) Utility Press:

Utility presses adaptable to uses in machine shops and tool rooms are described on sheet. General uses includes shearing punches and dies, separating punch and die holders on large liner pin die sets, assembly and alining of punches and dies, use as a straightening press, etc. Producto Machine Co.

COMPANY 72 38 5 2 % POSITION 8 3 2 3 3 4 8 7 7 m M = 2 2

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# - Information Free

## (13) Millers:

Universal vertical milling machines also adaptable to precision boring operations are described in catalog No. 12-40. Unique table unit construction permits tilting 35 deg. to either side of horizontal for angular cutting, accomplished by a large worm and gear, and four heavy T-slot bolts to lock the table unit in any position. Graduated segment gives position in degrees. W. B. Knight Machinery Co.

### (14) Fans:

Portable fans for industrial applications made for a variety of air capacities and capable of delivering air at different velocities are described in bulletin No. 160-5. Fan prevents recirculation of stale air yet affords extra ventilation by moving considerable quantities of secondary air. Features stressed include safety, durability and mobility. Coppus Engineering Corp.

#### (15) Washfountains:

Washfountains, multi-stall showers and other types of group washing equipment are shown and described in catalog No. 4010. Finished in enameled iron or stainless steel, foot or hand controlled, fountains feature low-cost installation, minimum floor space, water economy, lower maintenance costs, improved sanitation and attractive appearance. Construction diagrams are shown. Bradley Washfountain Co.

## (16) Spray Nozzles:

2822

Spray nozzles for descaling hot steel are shown and described briefly in folder. Nozzle consists of two parts: header adapter made of stainless steel, and nozzle forged from solid bar of Monel. Giving maximum impinging force, the nozzle orifice is designed to control pattern of spray so that its thickness is the same at the side as in the middle. Trabon Engineering Corp.

## (17) Press Brakes:

Brake type bending presses for operation at rated capacities on all classes of materials, furnished with extended beds and rams and available in standard or special sizes, are shown and described in bulletin No. B-1. Features of frame, ram and slides, ram connections and adjustments, etc., are given. Clearing Machine Corn.

### (18) Flexible Bronze Hose:

Engineering data, detailed drawings, concise text and illustrations covering concise text and illustrations covering packless flexible bronze hose, detachable couplings and self-flaring copper tube fittings are contained in catalog. Newly developed dimensions and applications on force-feed lubricators, steam laundry connectors, one-piece vibration absorbers, etc., are included. Packless Metal Products Corp.

Motors suitable for power plant applications of 1 hp. and larger are listed and the more important ones described in bulletin No. B-6107, "Motors for Driving Power House Auxiliaries." Assembly views and construction details are shown. Allis-Chalmers Mfg. Co.

## (20) Wheel Conveyors:

Light weight wheel conveyors carrying loads up to 500 lb., designed for speedy handling of boxes, cartons, cases, or any uniform product, are described in leaflet. Welded construction adds strength and couplings are simply and thoroughly protected against bending. No lubrication is required. Wheel bearings are dust-proof and have hardened ball races. Metzgar Co.

(21) Rust Prevention:
No-Ox-Id, "Special," heavy, grease-like, semi-transparent, non-drying coating for prevention of rust on steel structures is discussed in bulletin No. 3002. Other rust preventives for varied applications are listed with uses and methods of application described. Dearborn Chemical

GIV

## (22) Coal Tar Products:

Uses and chemical characteristics of various coal tar products such as ammonium thiocyanate, flotation sulfur, benzene, toluene and others are stated briefly in small booklet. Made in commercial quantities, application of compounds to industrial needs is discussed. Koppers Co.

#### (23) Rocker Barrels:

Rotoblast rocker barrels, designed for cleaning of metal parts without the use of compressed air, are described in bulletin No. 213. Diagrams and pictures show in detail construction features and operating characteristics. Pangborn

## (24) Metal Cleaning:

Data on materials and methods designed for cleaning different types of metals and alloys before electro-plating or other finishing operations is contained in 32-page booklet. Improved methods for cleaning polished steel without pre-soaking or subsequent wiping or brushing operations are discussed. Oakite Products Inc.

## (25) Centrifugal Casters:

Vertical centrifugal casting machines are subject of bulletin No. 140. Illustrations show types of steel castings which can be poured on machines. Castings subjected to shock loads, high pressures or extraordinary wear are said to benefit especially by centrifugal forming. Typical castings are shown. Centrifugal Casting Machine Co.

### (26) Disc Clutches:

Stud drive disc clutches ranging in capacity from 13 to 200 hp. at 100 r.p.m. are described in bulletin No. L-29, together with necessary mounting dimensions and torque data, given in tables. Breakdown view shows parts. Conway Clutch Co.

36 27 38 COMPANY 8 26 35 35 34 25 34 33 35 56 and 32 32 32 POSITION .0 322 22 3222

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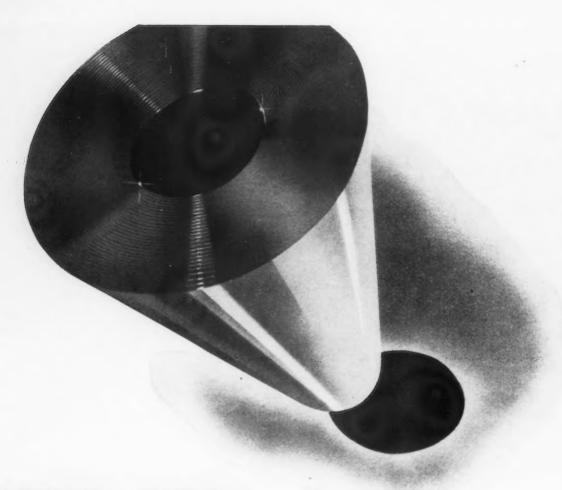
Heat is generated in insulated chamber (A) away from the work, driven by the powerful Cyclone Fan (B) at a 2-mile-a-minute rate through work chamber (C). That's the exclusive Cyclone forced convection heating principle which assures the rapid, accurate heating of every part of the charge, producing perfect hardness uniformity.

charge with such terrific velocity that parts are brought to heat in a fraction of the time previously thought necessary. This rapid heating, plus unwavering control over temperature for the soaking period, means uniform tempering of every part in the charge...means fewer rejections and fewer production-slowing delays for re-tempering. For positive proof of these points...and of Cyclone's economy of operation, accessibility of all working parts for easy servicing, abuse-proof rugged construction...and others exclusive in Cyclone Furnaces, write for Bulletin 52.

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TEMPERING FURNACES



## ROUND PEGS

## for round production holes

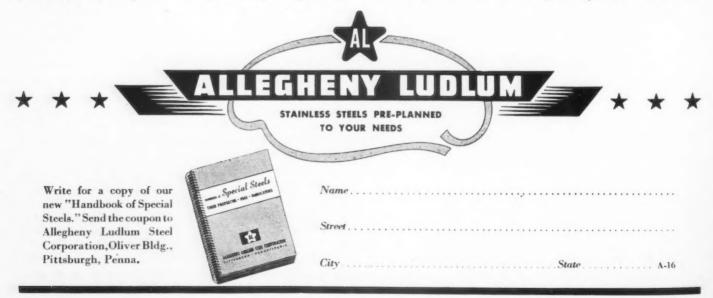
If there were just one stainless and heat-resistant steel, instead of dozens of variations, life would be simpler for us and a lot tougher for you. In fact, after one trial, you'd probably swear off stainless forever.

But we make stainless to fit—produce it with the proper analysis, physicals, etc. to meet the eventual conditions of service, yet fabricate easily and inexpensively in your plant. And we continue to produce

your particular grade in close uniformity, lot after lot.

That's a job which calls for the technical skill and experience of a pioneer. It's something for you to remember, along with the fact that Allegheny Stainless is produced in every needed form or shape, and available from convenient stocks nationwide.

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The illustration shows Elwell-Parker high lift

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from inside car and lifts to 69"—yet can be built to tier to almost any height in storage.

ELN is but one of six types of Trucks, Tractors and Cranes developed and continually refined through years of progressive building. Experienced Elwell-Parker Engineers will select the proper equipment to handle *your* loads with sound

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The Elwell-Parker Electric Company, 4225 St. Clair Avenue, Cleveland, Ohio.

ELWELL-PARKER Power Industrial TRUCKS

ESTABLISHED 1893 . BUILDING POWER INDUSTRIAL TRUCKS SINCE 1906



## to pack his bag in a hurry!"

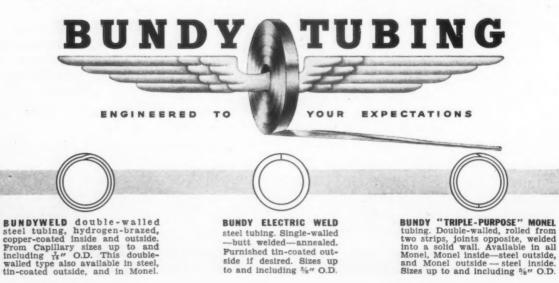
Y is a busy Bundy sales engineer. Hurryup trips are commonplace to him-trips which take him all over the industrial United States to help manufacturers with tubing problems.

All through industry, volume producers have learned that any tubing problem is Bundy's problem—a problem which may be laid safely in the lap of the Bundy research and engineering department and left there for solution.

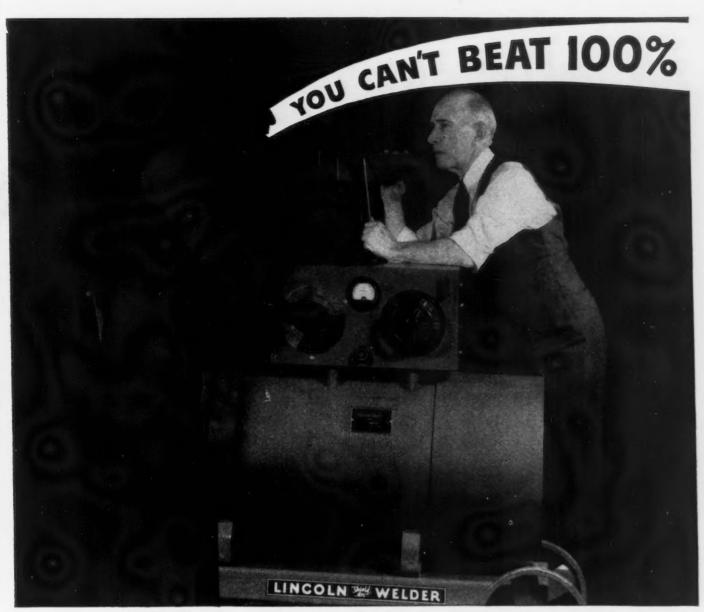
There's a good sound reason for this

confidence. Bundy is an organization of specialists-not only in the manufacture of tubing, but in its fabrication. As a result, a large proportion of Bundy's output is sold as finished parts, ready for final assemblywith all forming operations completed and all fittings included.

If tubing in or near Bundy's range of sizes forms a part of your finished product, why not take a leaf from the book of those manufacturers who let Bundy take all product design of tubing parts right off their hands? Address—Bundy Tubing Co., Detroit.



Furnished tin-coated out-side if desired. Sizes up to and including 5%" O.D.



ALTER EGO: Literally "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

**ALTER EGO:** What this new welder does for us should make you want to light a match under all the antiques we're operating and standardize on Lincoln.

The others seem to be satisfactory. Let's match performances—Lincoln versus—

ALTER EGO: Matching performances is right where the Lincoln shines! It is the only welder with Dual Continuous Control—in other words, with a Current Control PLUS a Job Selector—BOTH continuous in selection and self-indicating.

So what?

**ALTER EGO:** Then there can be no matching because that one advantage gives us unmatchable ease of control, unmatchable range of application and unmatchable arc stability.

All right, suppose my job is an overhead fillet weld. Then what?

ALTER EGO: Just set the Job Selector for "Overhead" and set the Current Control for any amperage to suit the size of plate and electrode. Then you're set for faster welding, less spatter and a stronger weld. Likewise for ALL types and sizes of work... in all positions. So if we make the shop 100% Lincoln, we get those benefits 100%. Can we afford less than 100%?

And what would appeal to me would be to pin undivided responsibility on Lincoln for tops in welding performance.

LINCOLN SUGGESTS: We are able, willing and eager to assume undivided responsibility to assure you tops in welding performance. Lincoln users get just that. 31 reasons for Lincoln's unmatchable performance are discussed in Bulletin 412, Pages 12-16—gladly mailed you on request.

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# IN THE DARK ALL CATS ARE BLACK



# Tantalum-Tungsten Carbide Tools

## PROVE their worth ... at LOWER cost

If you buy in the dark you must expect less than you pay for.

This is particularly true in the purchase of carbide tools—especially today.

This fact is irrefutable: Wherever outstanding jobs of steel cutting are being done today, Tantalum Carbide tools are doing them. And of all brands of Tantalum Carbide, Vascoloy-Ramet Tantalum-Tungsten Carbide tools are doing the best job.

For instance, in many important plants the majority of steel being cut today is being cut with Vascoloy-Ramet Tantalum-Tungsten Carbide Tools.

This is because the Fansteel Metallurgical Corporation and its associated and affiliated companies have "fathered" the scientific research and development which has resulted in the best carbide tools available.

These scientists, working with the crude ores, were the first to blend a carbide that would cut steel—Tantalum Carbide, which, because of its low coefficient of friction, eases its way through tough steel with less tool wear, cratering and chip wear and consequent longer tool life and lower cost.

Furthermore, Fansteel pioneered and developed the use of pure Tantalum in this country; is one of the largest producers of pure Tungsten; and has the largest staff of research scientists in the field of powder metallurgy. In Vascoloy-Ramet tools you have all the combinations of Tantalum Carbide, Tungsten Carbide, Tantalum-Tungsten Carbide, Titanium Carbide, plus all the grades and basic shapes necessary to meet any metal cutting problem.

The combination of the engineering skill of the Vascoloy-Ramet Corporation; Fansteel's scientific research; the standing of its associate company, Vanadium-Alloys Steel Company, and the broad experience of leading tool manufacturers who are authorized Vascoloy-Ramet agents, assure you excellent cooperation and service.

This manual tells the entire story of Vascoloy-Ramet tools and blanks; their available grades and shapes and suggestions for their use. Send for it.



## VASCOLOY-RAMET CORPORATION

an affiliate of
VANADIUM-ALLOYS STEEL COMPANY

and Pittsburgh, Pennsylvania
FANSTEEL METALLURGICAL CORPORATION

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# What does material handling cost you?

Frankly, most plants don't know. But universally it is recognized that handling materials costs a lot, without adding value to the product. And this is why modern production studies are revealing the industrial truck as a way to cut down handling and rehandling of materials.

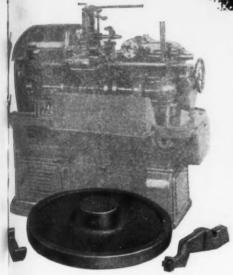
Goods placed upon a pallet are toys in the hands of the modern battery industrial truck. It picks them up and sets them down as easily as you handle a lead pencil. Naturally, in an industrial truck, the power source must be thoroughly dependable if the truck is to operate at maximum efficiency. And that is exactly what Edison Alkaline Batteries were designed to do.

The Edison Battery is structurally strong (built of steel) and electrochemically sound (no self-deteriorating reactions). While it costs more than other batteries, it lives two to five times as long. Wherever careful cost-accounting is employed, it is almost always instantly revealed as the most economical way to power a truck. (It's cheap as line current!) You will find your local Edison representative informed and helpful in handling methods.

# Edison Battery

DIVISION OF THOMAS A. EDISON, INC., WEST ORANGE, N. J.

# The "QUALITY ADVANTAGES" Required For Any Part With Those Required For Any Part With Those OFFERED BY FORGINGS



Manufacturer of Brown & Sharpe Machine Tools uses forgings to facilitate rapid production. On their Universal Milling Machines, they used forged gears to provide uniform gear tooth strength and satisfactory machining quality. On the Automatic Screw Machines, a forged chuck lever effectively protects the chuck feed mechanism against breakdown because, being forged and then heat-treated, it has the plus-strength required for such a part. On their Wire Feed Hand Screw Machines, forgings are employed to good advantage in the assembly of an indexing turret which is automatically locked when a new tool position is reached. The turret locking hand lever is a forging providing maximum wear resistance.

# Strength: plus tensile and torsional strength. Uniformity of Physical Properties: obtainable in forgings in the exact degree desired. Weight Reduction: through maximum strength and lighter sectional thicknesses.

4. Welding Adaptability: widest range for fabricating complicated parts from two or

7 "QUALITY ADVANTAGES" OF FORGINGS:

more forgings.

5. Lower Machining Costs: forgings shaped in closed dies require a minimum of machin-

ing and finishing.
6. Safety: through freedom from concealed

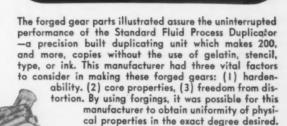
defects.

 Endurance: forgings provide high fatigue resistance which insures dependable performance over longer periods of use.



Compactness and minimum weight are realized in Eclipse Aircraft Engine Starters by the use of these forged parts: starter driving jaw, starter bell crank, motor strap "T" bolt, starter flywheel dog, and motor engaging jaw. The manuschurer of this starting unit cites this benefit: "A final advantage is lower machining costs. With forgings, our machining scrap is reduced to a minimum because, being staped in closed dies to close tolerances, there's no excess metal bulk to be removed."

HERE ARE NO SUBSTITUTES FOR FORGINGS





#### HELPFUL SUGGESTIONS

"Drop Forging Topics" presents actual applications of forgings in a wide variety of types of equipment and tells the advantages and economies derived from the use of forgings by various manufacturers. "Drop Forging Topics" is sent free to engineers, designers, metallurgists, production and management executives. If you are not receiving it, send us your name today. It's free.

DROP FORGING ASSOCIATION

SYMBOLIC EMBLEM OF THE DROP FORGING ASSOCIATION



In the Wallingford Steel plant of the Allegheny Ludlum Steel Corporation Day in and day out, this 13" x 16" Cold Strip Finishing Mill is demonstrating in a practical way the high efficiency of this Waterbury-Farrel installation. Speeds from 200 to 600 feet per minute on steel strip up to 10" wide. The Automatic Adjustable Tension Drum Winder with power stripper, provides constant tension on the strip from start to finish; it will accommodate coils up to 1500 pounds.

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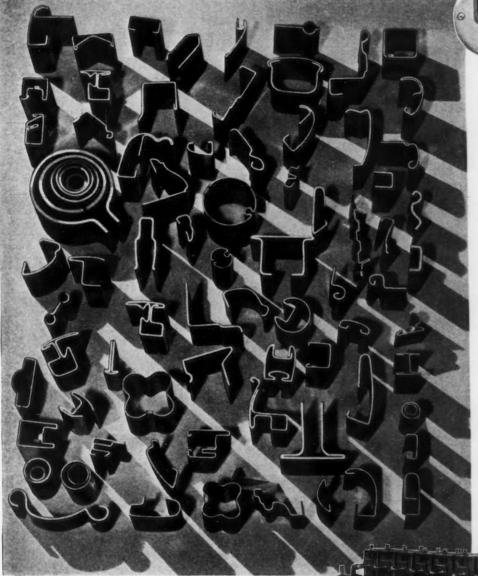
Illinois round-grain sand is more durable in these operations, since the particles do not split as readily, but wear down evenly and more gradually.

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Harrison Abrasive Corp., Manchester, Bon H. N. H.
Pangborn Corporation, Hagerstown, Md.
Pittsburgh (Pa.) Crushed Steel Co.
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Jones & Laughlin Steel Corp., Pittsburgh.
Ryerson, Jos. T. & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel
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Steel & Tubes Div. of Republic Steel
Corp., Cleveland.
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United Engineering & Fdry. Co., Ptgh.

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Cramp Brass & Iron Foundries Div. of
The Baldwin Locomotive Wks., Philadelphia.

delphia. National Lead Co., 111 Bdway., N. Y. C. Ryerson, Jos. T., & Son, Inc., Chicago, Ill. BALANCING EQUIPMENT BALANCING EQUIPMENT
Sundstrand Machine Tool Co., Rockford, Ill.
BALANCING MACHINES — Static Dy-

BALANCING MACHINES—State Dynamie
Gisholt Machine Co., Madison, Wis.
BALING PRESSES—Scrap—See Presses—Baling
BALLS—Burnishing
Abbott Ball Co., The, 1047 New Britain
Are., Hartford, Conn.
Hartford (Conn.) Steel Ball Co., The.
BALLS, Steel
Abbott Ball Co., The, 1047 New Britain
Are., Hartford, Conn.
Fafnir Bearing Co., The, New Britain,
Conn.

Conn.
Hartford (Conn.) Steel Ball Co., The.
MeIntyre Machine Works, Hartford, Conn.
New Departure Div., General Motors Sales
Corp., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie
Are., Phila., Pa.
Strom Steel Ball Co., Cicero, Ill.
BANDS—Steel
Concord Steel Corp., 19 Rector St., New
York City.
Tennessee Coal, Iron & Railroad Co.
(U. S. Steel Corp., Subsidiary), Birmingham, Ala.

York City.

Tennessee Coal. Iron & Railroad Co.

(U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BARRELS—Burnishing
Abbott Ball Co., The, 1047 New Britain
Ave., Hartford, Conn.

BARRELS—Sand Blast
American Foundry Equip, Co., The, 510 S.
Byrkit St., Mishawaka, Ind.

Hydro-Blast Corp., The, Chicago, Ill.

BARRELS—Tumbing
Baird Mch. Co., The, Bridgeport, Conn.

Hartford (Conn.) Steel Ball Co., The.

Whiting Corp., Harvey, Ill.

BARS—Alloy
Copperveld Steel Co., Warren, Ohio.

Midvale Co., The, Nicetown, Phila., Pa.

Republic Steel Corp., Cheveland, Ohio.

Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

BARS—Aluminum
Aluminum Co. of America, Pittaburgh.

BARS—Brass, Bronze or Copper

Runting Brass & Bronze Co., Toledo, Ohio.
Iohnson Bronze Co., 505 So. Mill St., New
Castle. Pa.

BARS—Cold Drawn
American Steel & Wire Co. (U. S. Steel
Corp. Subsidiary), Cleveland.

Bilss & Laughlin, Inc., Harvey, Ill.;

Ruffalo, N. Y.

Holliday, W. J., & Co., Hammond, Ind.

Jones & Laughlin, Steel Corp., Pittaburgh,
Monarch Steel Co., Indianapolis, Ind.

Union Drawn Steel Div. Republic Steel
Corp., Massillon. Ohio.

BARS—Conertee, Reinforelag

Bethlehem (Pa.) Steel Company.

Carnegie-Fillinois Steel Corp. (U. S. Steel
Corp. Subsidiary), Pittaburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Caiff. Jones & Laughlin Steel Cepp., Phusourgh. Laclede Steel Co., St. Louis, Mo. Nicetown Piate Washer Co., Inc., Phila-

delphia.

Tennessee Coal, 1ron & Railroad Co.
(U. S. Steel Corp. Subsidiary), Bir-

Currentessee Coal, Iron & Railroad Co.

(U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BARS—Magnesium Alloys
American Magnesium Corp., 1701 Guif
Bidg., Pittsburgh.

Dow Chemical Co., The, 921 Jefferson Ave.,
Midland, Mich.

BARS—Rustless.

Midvale Co., The, Nicetown, Phila., Pa.

Rustless Iron & Steel Corp., Baltimore, Md.

BARS—Steel
Beals-McCarthy & Rogers, Inc., Buffalo,
New York.

Bethlehem (Pa.) Steel Company.

Brown-Wales Co., Boston, Mass.

Carnegie-liinois Steel Corp. (U. S. Steel
Corp. Subsidiary), Pittsburgh & ChiCago.

Corp. Subsidiary), Pittiburgh & Chicago.
Concord Steel Corp., 19 Rector St., New
York City.
Copperweld Steel Co., Warren, Ohio.
Frasse, Peter A., & Co., Inc., 17 Grant,
St., New York City.
Great Lakes Steel Corp., Ecorse, Detroit
Holliday, W. J., & Co., Hammond, Ind.
inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh
LaSalle Steel Co., Indianpolis, Ind.
Potts, Horace T., Co., Philadelphia, Pa.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel
Corp., Subsidiary), Chicago.
Steel & Tubes Div. of Republic Steel
Corp., Cleveland,
Tennessee Coal, Iron & Rallroad Co.
(U. S. Steel Corp., Subsidiary), Birmingham, Als.
Timken Roller Bearing Co., The, Canton, O.

(U. S. Steel Corp. Subsidiary), Birmingham, Ala. Timken Roller Bearing Co., The, Canton, O. Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O. Wisconsin Steel Co., Chicago, Ill. Youngstown (Ohio) Sheet & Tube Co., The BATTERIES—Storage Edison Storage Battery Div. of Thomas A. Edison, Inc., West Orange, N. J. Electric Storage Battery Co., The, Phila., Philo, Battery Div., Phila., Pa.

Philco, Battery Dir., Phila., Ps.
BATTERY CHARGERS
Cutler-Hammer, Inc., Milwaukee.
BEAMS—See Angles, Beams, Channels
and Tees
BEARINGS—Babbitt
Bunting Brass & Bronze Co., The, Toledo,
Ohio.
Cadman, A. W., Mfg. Co., Pittsburgh.
Johnson Bronze Co., 505 So. Mill St., New
Castle, Pa.
BEARINGS—Ball
Bantam Bearings Corp., The, South Bend,
Ind.

Bantam Bearings Corp., The, South Bend, Ind. Bearings Co. of America, Lancaster, Pa. Fafnir Bearing Co., The, New Britain, Conn. deral Bearings Co., Inc., The, Poughkeepsie, N. Y.
McIntyre Machine Works, Hartford, Conn.
New Departure Div., General Motors Sales
Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stam-

Norma-Hoffmann Bearings Corp., State ford, Conn.
SEF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Torrington (Conn.) Company.
SEARINGS, Brass and Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
National Bearing Metals Corp., Pittsburgh.
Shenango-Penn Mold Co., Dover, Ohio.

National Bearing Metals Corp., Pittsburgh. Shenangar-Penn Mold Co., Dover, Ohlo.
BEARINGS—Needle
Torrington (Conn.) Company.
BEARINGS—Oilless
Bunting Brass & Bronze Co., Toledo, O.
Rhoades, R. W., Metaline Co., Inc., Long
Island City, N. Y.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
BEARINGS—Quill
Bantam Bearings Corp., The, South Bend,
Ind. Ind.
BEARINGS—Radial
Bantam Bearings Corp., The, South Bend,

Bower Roller Bearing Co., Detroit. Mich. Fafnir Bearing Co., The, New Britain, Federal Bearings Co., Inc., The, Pough-

Hyatt Bearings Div. General Motors Sales Corp., Harrison, N. J. Corp., Harrison, N. J.

New Departure Div., General Motors Sales
Corp., Bristol, Conn.

Norma-Hottmann Bearings Corp., Stamford, Conn.

SKF Industries, Inc., Front St. & Erle
Ave., Pinia., Pa.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BEARINGS-Roll Neck bantam Bearings Corp., The, South Bend, Ind.
Morgan Construction Co., Worcester, Mass.
SKF Industries, Inc., Front St. & Erie
Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton,

BEARINGS-Roller Bantam Bearings Corp., The, South Bend, Bantam Bearings Corp., The, South Bend, Ind.
Rower Roller Bearing Co., Detroit, Mich, Hyatt Bearings Div. General Motors Sales Corp., Harrison, N. J.
Link-Belt Co., 519 North Holmes Ave. Indianapolis, Ind.
Norma-Hoffmann Bearings Corp., Stamford Corp.

ford, Conn. SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa Timken Roller Bearing Co., The, Canton, O. BEARINGS-Roller Tapered
Bantam Bearings Corp., The, South Bend,
Ind.

Ind.

Bower Roller Bearing Co., Detroit, Mich.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Rolling Mill Equipment
Bantam Bearings Corp., The, South Bend,
Ind. Ind.
Morgan Construction Co., Worcester, Mass.
SKF Industries, Inc., Front St. & Erie
Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS-Shaft Hanger Fafnir Bearing Co., The, New Britain,

Conn.

Hyatt Bearings Div. General Motors Sales
Corp., Harrison, N. J.

Norma-Hoffmann Bearings Corp., Stamford, Conn.

SKF Industries, Inc., Front St. & Erie
Ave., Phila., Pa.

REARINGS-Thrust Bantam Bearings Corp., The. South Bend, Ind.

Rearings Co. of America. Lancaster, Pa.

Fafnir Bearing Co., The, New Britain, Conn.
Federal Bearings Co., Inc., The, Pough-

keepsie, N. Y.

Hyatt Bearings Div. General Motors Sales
Corp., Harrison, N. J.

New Departure Div., General Motors Sales
Corp., Bristol, Conn.

Norma-Hoffmann Bearings Corp., Stamford, Conn.

SKF Industries, Inc., Front St. & Eris
Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Timken Roller Bearing Co., The, Canton.O.

Timken Roller Bearing Co. The, Canton.O.
BELT.—Conveyor, Elevator
Howitz Rubber Corp., Buffalo. N. Y.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Towsend
St., Passaic, N. J.
BELTING—Leatner
Chicago (III.) Rawhide Mfg. Co., The,
1806 Elston Ave.
Houghton, E. F., & Co., Philadelphia, Pa,
BELTING—Metal, Conveyor, High and
Low Temperature
Wickwire Spencer Steel Co., 500 Fifth
Ave., N. Y. C.

Ave., N. Y. C.

BELTING—Rubber
Hewitt Rubber Corp., Buffalo. N. Y.

Manhattan Rubber Mfg. Div. of Raybestos-Manhattan. Inc., The. 2 Towsend
St., Passaic. N. J.

St., Passaic, N. J.

BELTS—V-Type
Allis-Chalmers Mfg. Co., Milwaukee.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Towsend
St., Passaic, N. J.

BENCH LEGS—Steel
New Britain-Gridley Machine Div., The
New Britain Machine Co., New Britain,
Conn.
Standard Pressed Steel Co., Jenkintown,
Pa.

BENCHES—Steel Work Standard Pressed Steel Co., Jenkintown, Pa.

BENDING—Pipe and Tube
Swan Engineering Co., Inc., Newark, N. J.

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R-12

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Cleveland (Ohio) Punch & Shear Works
Co., The.
Dreis & Krump Mfg. Co., Chicago, Ill.
Niagara Machine & Tool Works, Buffalo,
N. Y. Co., The, Cleveland, Ohio. BENZOL RECOVERY PLANTS
Koppers Co., Engineering & Construction
Div. Pittsburgh BERYLLIUM COPPER American Brass Co., The, Waterbury, Conn. Harrisburg (Pa.) Steel Corp.
Midvale Co., The, Nicetown, Phila., Pa. BILLETS—Alloy Steel
Andrews Steel Co., The. Newport, Ky.
Copperweld Steel Co., Warren, Ohio. BILLETS-Carbon Harrisburg (Pa.) Steel Corp. BILLETS-Carbon Steel Andrews Steel Co., The, Newport, Ky. BILLETS—Chrome Nickel Steel
Rustless Iron & Steel Corp., Baltimore, Md. BILLETS-Chrome Steel Rustless Iron & Steel Corp., Baltimore, Md. BILLETS—Forging
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.,
Republic Steel Corp., Cleveland, Ohio. BILLETS—Re-rolling
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky. Andrews Steel Co., The, Newport, Ky.

BILLETS—Re-rolling Facilities
Nicetown Plate Washer Co., Inc., Philadelphia, Pa.

BILLETS—Steel
Bethlehem (Pa.) Steel Company,
Continental Steel Corp., Kokomo, Ind.
Copperweld Steel Co., Warren, Ohio.
Holliday, W. J., & Co., Hammond, Ind.
Jones & Laughlin Steel Corp., Pittsburgh,
Tennessee Coal, Iron & Ráilroad Co.
(U. S. Steel Corp., Subsidiary), Birmingham, Ala.
Wisconsin Steel Co., Chicago, Ill.
BLANKS—Chisel BLANKS—Chissi Cleveland (Ohio) Punch & Shear Works Co., The. Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio. BLANKS—Gear and Pinion Chicago (Ili.) Rawhide Mfg. Co., The, 1306 Elston Ave. 1306 Elston Ave.

BLAST CLEANING EQUIPMENT
American Foundry Equipment Co., The
510 S. Byrkit St., Mishawaka, Ind.
Hydro-Blast Corp., The, Chicago, Ill.
Pangborn Corporation, Hagerstown, Md. BLAST FURNACE PLANTS—Complete Brassert, H. A., & Co., Pittsburgh, Pa. McKee, Arthur G., & Co., Cleveland. BLAST FURNACE SPECIALTIES Balley, Wm. M., Co., Pittsburgh, Pa. McKee, Arthur G., & Co., Cleveland. BLAST GATES Rockwell, W. S., Co., 50 Church St., N.Y.C. BLOCKS—Chain Ford Chain Block Div. American Chain & Cable Co., Inc., Philadelphia, Pa. Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa. BLOWERS DEWERS

merican Blower Corp., 6000 Russell St.,
Detroit. Mich.
gersoil-Rand Co., 11 Broadway, New Ingersoll-Rand Co., 11 Broadway, New York City. North American Mfg. Co., The, Cleveland, Ohio. cer Turbine Co., Hartford, Conn. BLOWERS—Blast Furnace Allis-Chalmers Mfg. Co., Milwaukee, Wis. BLOWERS—Centrifugal
Allis-Chalmers Mfg. Co., Milwaukee, Wis, Allis-Chalmers Mfg. Co., Milwaukee, Wis, BLOWERS—Cusola Allis-Chalmers Mfg. Co., Milwaukee, Wis. BLOWERS—Fan Housings Detroit (Mich.) Stamping Co. BLOWERS—Rotary & Centrifugal Roots-Connersville, Ind.
BLOWPIPES—Oxy-Acetylene Welding & Cutting Linde Air Products County Cutting Inde Air Products Company, The, 30 East 42nd St., N. Y. C. Peldit Acetylene Co., Detroit, Mich. LOWPIPES — Soldering, Heating, Annealing nealing
American Gas Furnace Co., Eltzabeth,
N. J.
Weldit Acetylene Co., Detroit, Mich.
BLUE PRINT PAPER BLUE PRINT PAPER
Pease. C. F., Company. The, 2695 W.
Ivving Pk. Road. Chicago. III.
BLUE PRINTING MACHINERY
Pease. C. F., Company. The, 2695 W.
Irving Pk. Road, Chicago, III.
BOILERS—Waste Heat
Bahcock & Wilcox Co., The, 85 Liberty
St. N. Y. C.
ROILERS—Water Tube
Bahcock & Wilcox Co., The, 85 Liberty
St., N. Y. C.

BENDING MACHINES—Hand, Band and

BOLT CUTTERS Landis Mch. Co., Inc., Waynesboro, Pa. BOLT AND NUT MACHINERY

Ajax Mfg. Co., The, Cleveland, Ohio.
Landis Machine Co., Inc., Waynesboro, Pa

Waterbury (Ct.) Farrel Fury. & Man

Co., The. Co., The.

BOLT & RIVET CLIPPERS
Helwig Mfg. Co., St. Paul, Minn.
BOLTS—Carrlage and Machine
Bethlehem (Pa.) Steel Company.
Cleveland (Ohio) Cap Screw Co., The.
Erle (Pa.) Bolt & Nut Co
Lamson & Sessions Co., The, Cleveland.
Russell, Burdsall & Ward Bolt & Nut
Co., Port Chester, N. Y.
Triplex Screw Co., Cleveland.

BOLTS—Special Triplex Screw Co., Cleveland.

BOLTS—Special
Cleveland (Ohio) Cap Screw Co., The.
Eric (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Russell, Burdsall & Ward Bolt & Nut
Co., Port Chester, N. Y.

BOLTS—Special, Hot or Cold Upset
Lamson & Sessions Co., The. Cleveland.
Russell, Burdsall & Ward Bolt & Nut Co.,
Port Chester, N. Y. BROACHES BOLTS—Stove Lamson & Sessions Co., The, Cleveland. Progressive Mrg. Co., Torrington, Conn. Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y. BOLTS—Stove, Recessed Head American Screw Co., Providence, B. I. BOLTS—Track Carnegie-Illinois Steel Corp. (U. S. Steel Corp., Subsidiary), Pittsburgh & Chi-BOLTS AND NUTS BOLTS AND NUTS
American Screw Co., Providence, B. L
Bethlehem (Pa.) Steel Company.
Clark Bros. Boit Co., Milldale, Conn.
Cleveland (Ohio) Cap Screw Co., The.
Erie (Pa.) Boit & Nut Co
Lamson & Sessions Co., The. Cleveland.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdsall & Ward Boit & Nut
Co., Port Chester, N. Y.
Triplex Screw Co., Cleveland. BOLTS AND NUTS—Self Locking Lamson & Sessions Co., The, Clevelan Russell, Burdsall & Ward Bolt & Nut Port Chester, N. Y. Port Chester, N. Y.
BORING BARS
Bullard Co., The, Bridgeport, Conn.
Carboloy Co., Inc., 11153 East 8-Mile
Road, Detroit, Miehigan.
Gairing Tool Co., The, Detroit.
Gisholt Machine Co., Madison, Wisconsin, Gisholt Machine Co., Madison, Wisconsin, BORING, DRILLING & MILLING MACHINES—Horizontal Giddings & Lewis Machine Tool Co., Fond Du Lac, Wis.
Hill-Clarke Mchry. Co., 647 W. Washington Blyd., Chicago.
Lucas Machine Tool Co., Ceveland.
Sellers, William, & Co., Inc., 1620 Hamilton St., Philadelphia, Pa. BORING & DRILLING MACHINES-Co., The. Bridgeport, Conn BORING MACHINES—Diamond & Car-bide Tools Heald Machine Co., Worcester, Mass. BORING MACHINES—Jig Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn. BORING MACHINES—Precision Cimatool Co.. The. Dayton. Ohio. Ex-Cell-O Corp., 1210 Oakman Blvd., De-troit. Mich. troit. Mich.

BORING & TURNING MILLS—Vertical

Bullard Co., The, Bridgeport, Conn.

Cincinnati (Ohio) Planer Co.

Sellers. William, & Co., Inc., 1620 Hamilton St., Philadelphia, Pa.

BOXES—Stacking

All-Steel-Equip. Co., Inc., 702 John St.,

Aurora, Ill.

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North Bros. Mfg. Co., Philadelphia, Pa. BRAKE LINING & BLOCKS—Asbestos Manhattan Rubber Mfg. Div. of Ray-bestos-Manhattan, Inc., The, 2 Towsend St., Passalc, N. J. BRAKES—Electric Clark Controller Co., The, Cleveland. Cutler-Hammer, Inc., Milwaukee. Electric Controller & Mfg. Co., The, Cleveland. BRAKES—Electric & Mechanical Clark Controller Co., The. Clevelan Electric Controller & Mfg. Co., Cleveland. BRAKES-Magnetie Stearns Magnetie Mfg. Co., 635 So. 28th St., Milwaukee. St., Milwaukee.

BRAKES—Metal Forming
Bryant Machinery & Engineering Co.,
Chicago.
Cincinnati (Ohio) Shaper Co., The.
Cleveland Crane & Engineering Co.,
The Steelweld Mchry. Div., 1115 East 283rd
Sb., Wickliffe. Ohio.
Dreis & Krump Mfg. Co., Chicago.

CABLE—Electric Co., Schenectady, N. Y. Lincoln Electric Co., The. Cleveland.

CABLEWAYS AND TRAMWAYS—See Ferracute Machine Co., Bridgeton, New Jersey. BREAKERS-Electric Circuit
Allis-Chalmers Mfg. Co., Milwaukee, Wis. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
BRICK—Fire Clay
Illinois Clay Products Co., Joliet, Ill.
BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty
St., N. Y. C.
Carboundum Co., The Perth Amboy, N. J.
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Stofan J. J. Co. Defenit, Mich. Siefen, J. J., Co., Detroit, Mich. BRICK-REFRACTORY BRICK-REFRACTORY
Carborundum Co., The Perth Amboy, N. J.
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Earle Gear & Mch. Co., Philadelphia.
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Electro Metallurgical Sales Corp., 30 East
42nd St., N. Y. C. BROACHES
Colonial Braach Co., Detroit.
Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich.
National Broach & Machine Co., Detroit, Mich.
BROACHING MACHINES
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Milling Mch. Co., The.
Colonial Broach Co., Detroit.
Lucas Machine Tool Co., Cleveland.
Oligear Co., The, 1311 W. Bruce St., Milwanker. Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

Waukee. FOR DIES

Ampco Metal, Inc., Milwaukee, Wis.

BRONZE—Phosphor

Bunbing Brass & Bronze Co., Toledo, Ohio.

Revere Copper & Brass, Inc., 230 Park

Ave., New York City.

BRUSHES—Industrial

Osborn Manufacturing Co., The, Cleveland, Ohio.

Pittsburgh Plate Glass Co., Brush Div.,

Baltimore, Md.

BRUSHES—Machine

Osborn Manufacturing Co., The, Cleveland, Ohio.

Pittsburgh Plate Glass Co., Brush Div.,

Baltimore, Md.

BRUSHES—Motor & Generators

National Carbon Co., Inc., Carbon Sales

Div., Cleveland, Ohio.

BRUSHES—Paint

Osborn Manufacturing Co., The, Cleveland, Ohio.

PIUSHES—Paint

Osborn Manufacturing Co., The, Cleveland, Ohio.

PRUSHES—Paint

Osborn Manufacturing Co., The, Cleveland, Ohio.

PIttsburgh Plate Glass Co., Brush Div., Osborn Manufacturing Co., The, Cook land, Ohio.
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.
BRUSHES-Wire
Osborn Manufacturing Co., The, Cleve-Osborn Manufacturing Co., The, Cieve-land, Ohio.
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.
BUCKETS—Clamshell
Blaw-Knox Div. of Blaw-Knox Co., Blaw-Blaw-Knox Div. of Blaw-Knox Co., Blaw-nox. Pa. Cullen-Friestedt Co., 1303 S. Kilbourn Ave., Chicago. Hayward Co., The, 50 Church St., N. Y. C. Heyl & Patterson, Inc., Pittaburgh. Industrial Brownhoist Corp., Bay City. Mich.

Weilman Engineering Co., The, Cleveland

BUCKETS—Electric Motor
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Orange Peel
Hayward Co., The, 50 Church St., N. Y. C.

BUFFERS—Portable
Rotor Tool Co., The, 50 Church St., N. Y. C.

BUFFERS—Bortable
Rotor Tool Co., The, Cleveland. Ohio.

BUILDINGS—Steel
Bull DINGS—Steel
American Bridge Co. (U. S. Steel Corp.
Subsidiary). Pittaburgh.
American Rolling Mill Co., The, Middletown, Ohio.

Belmont Iron Works. Philadelphia.

Blaw-Knox Div. of Blaw-Knox Co., Blaw-nox Pa.

Iron & Steel Products, Inc., Chicago.

BULLDOZERS
Ajax Mfg. Co., The, Cleveland, Ohio.

Cleveland Crane & Engineering Co., The
Steelweld Mchry. Div., 1115 East 283rd

Sb. Wiekliffe, Ohio.

BURNERS—Oil or Gas
American Gas Furnace Co., Elizabeth,
N. J.

Babcock & Wilcox Co., The, 85 Liberty St. man Engineering Co., The, Clevenerican Gas Futuación.
N. J.
Abecck & Wilcox Co., The, 85 Liberty St., No. New York City.
North American Mfg. Co., The, Cleveland, Ohio.
BURNISHING MACHINES—Gear
Ctmatool Co., The, Dayton, Ohio,
BURRING MACHINES
Cimatool Co., The, Dayton, Ohio,
National Broach & Machine Co., Detroit, Mich.
BUSHINGS—Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O
Johnson Bronze Co., 505 So. Mill St., New
Castle, Pa.
Shenango-Penn Mold Co., Dover, Ohio.
BUSHINGS—Drill Jig
Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit. Mich. troit. Mich.

RUSHINGS—Oilless

Rhoades. R. W.. Metaline Co., Inc., Long

Island City. N. V

RUSHINGS—Phossher Brenze

Runting Rrass & Rronze Co., Toledo. Ohio.

Phosphor Bronze Smelting Co., The, Phila
delphit Grass

CALCIUM METAL & ALLOYS
Electro Metallurgical Saies Corp., 30 Eass
42nd St., N. Y. C. CAMS Hartford (Conn.) Special Machinery Co., CARBIC Linde Air Products Company, The, 30 East 42nd St., N. Y. U. CARBIDE Air Reduction, 60 East 42nd St., N. Y. C. Linde Air Products Company, The. 30 East 42nd St., N. Y. C. CARBIDE—Boron Norton Co., Worcester, Mass. CARBIDES—Cemented Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan. CARBON—Brick & Powder National Carbon Co., Inc., Carbon Sales CARBURIZING BOXES CARBURIZING BOXES
American Manganese Steel Div. of
American Brake Shoe & Foundry
Chicago Heights, Ill.
Electro Alloys Co., Elyria, Ohlo.
CARBURIZING—See Heat Treating
CARLOADERS
Clark Tructractor Div. Clark Equit
Co., Battle Creek, Mich.
CARS—Dump, Automatic Air
Pressed Steel Car Co., Inc., Koppel
Pittsburgh, Pa. Clark Equipment Koppel Div. CARS—Dump, Side, End & Rotary Pressed Steel Car Co., Inc., Koppel Div., Pressed Steel Car Co., Inc., Koppel Div., Pittsburgh, Pa. CARS—Industrial and Mining Heyl & Patterson, Inc., Pittsburgh. CARS—Ladle, Ginder & Slag Pressed Steel Car Co., Inc., Koppel Div.. Pittsburgh, Pa. CARS—Railway CARS—Railway
Iron & Steel Products, Inc., Chicago.
CASE HARDENING—See Heat Treating
CASTERS
Darnell Corp., Ltd., Long Beach, Calift
CASTINGS—Acid or Heat Resisting
American Manganese Steel Div. of The
American Brake Shoe & Foundry Co.,
Chicago Heights, Ill.
Ampco Metal, Inc., Milwaukee, Wis.
Cramp Brass & Iron Foundries Div. of
The Baldwin Locomotive Wks., Philadelphia. delphia.
Electro Alloys Co., Elyria, Ohio.
Hoskins Mfg. Co., Detroit. Mich.
Lebanon (Pa.) Steel Foundry.
Mechanite Research Institute, Pittsburgh. Pa. Michiana Products Corp., Michigan City, Ind.
Ohio Steel Foundry Co., Lima, Ohio.
CASTINGS—Alloy iron
Cramp Brass & Iron Foundries Div. of
The Baldwin Locomotive Wks., Philadelphia.
Michiana Products Corp., Michigan City, Ind.

CASTINGS—Alloy Stee!
Advance Foundry Co., The. Dayton, Ohio.
American Manganese Steel Div. of The
American Brake Shoe & Foundry Co.,
Chicago Heights, III.
Electro Alloys Co., Elyria, Ohio.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh
Michiana Products Corp., Michigan City,
Ind.
National-Eric Corp., Eric. Pa. Ind.
National-Erie Corp., Erie, Pa.
National-Erie Corp., Erie, Pa.
Taylor-Wharton Iron & Steel Co., High
Bridge, New Jersey.
Uniteast Corp., Toledo, Ohio.
CASTINGS—Aluminum
Co. of America, Pittsburgh.
CASTINGS—Brass, Bronze, Copper of
Aluminum Aluminum Co. of America, Pittsburgh.
CASTINGS — Brass, Bronze, Copper or
Aluminum
Bunting Brass & Bronze Co.. The, Toledo,
Ohto.
Cadman. A. W., Mfg. Co., Pittsburgh.
Cramp Brass & Iron Foundries Div. of
The Baldwin Locomotive Wks., Philadelphia.
Koppers Co., Bartlett Hayward Div., Baltimore. Md.
National Bearing Metals Corp., Pittsburgh.
Shenango-Penn Mold Co., Dover. Ohto.
Spencer's, I. S., Sons, Inc., Guilford, Ck.
Wheeling (W. Va.) Bronze Casting Co.
CASTINGS—Corrosion Resisting
Allegheny Ludium Steel Corp., Pittsburgh,
Pa.
American Brass Steel Div. of The
American Brake Shoe & Foundry Co.,
Chicago Heights, Ill.
Cramp Brass & Iron Foundries Div. of
The Baldwin Locomotive Wks., Philadelphia.
Electro Alloys Co., Elvria, Ohio. ramp Blass & Iron Foundries Div. or The Baldwin Locomotive Wks., Phila-delphia. lectro Alloys Co., Elyria, Ohio, echanite Research Institute, Pittsburgh, Michiana Products Corp., Michigan City, Michiana Products Corp., Michigan Civy, Ind.
Midvale Co., The. Nicetown, Phila., Pa.
Ohio Steel Foundry Co., Lima, Ohio.
Wall-Colmonny Corp., Detroit. Mich.
Wheeling (W. Va.) Bronze Casting Co.
CASTINGS—Die, Aluminum
Aluminum Co. of America, Pittsburgh.
CASTINGS—Electric Steel
Continental Roll & Steel Foundry Co.,
East Chicago. Ind.
Crucible Steel Castings Co., Lansdowne, Ps. delphia. Pa.
BY-PRODUCTS COKE AND GAS
PLANTS
Ropners Co., Engineering & Construction
Div., Pittsburgh.

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IRVINE, WARREN COUNTY, PENNA., U. S. A.

Lebanon (Pa.) Steel Foundry. National-Eric Corp., Eric, Pa. Ohio Steel Foundry Co., Lima, Ohio. Uniteast Corp., Toledo, Ohio. Onto Steel Foundry Co., Lima, Onto.
Uniteast Corp., Toledo, Ohio.

CASTINGS—Gray Iron and Semi-Steel
Advance Foundry Co., The. Dayton, Ohio
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Engineering Co., Philadelphia
Brown & Brown, Inc., Lima, Ohio.

Cox & Sons Co., The, Bridgeton, N. J.
Cramp Brass & Iron Foundries Div. on
The Baldwin Locomotive Wks., Philadelphia N. J. Diamond Iron Works, Aller,
Minn.
Etna Machine Co., The, Toledo, Ohio.
Giliette-Vibber Co., The, New London, old Iron Works, Inc., Minneapolis, Gillette-Vibber Co., ABC, Daw Conn.
Koppers Co., Bartlett Hayward Div., Baltimore. Md.
Lobdell Car Wheel Co., Wilmington, Del.
National Boil & Fdry. Co., Avonmore, Pa.
North Wales (Pa.) Mach. Co., Inc.
Ramsey Chain Co., Inc., Albany. N. Y.
Spencer's, I. S., Sons, Inc., Guilford, Ct.
Sprout, Waldron & Co., 1400 Sherman St.,
Muncy. Pa. Muncy, Pa.

Muster Foundry Corp., Kingston, New York.
West Point (Georgia) Foundry & Machine
Co. CASTINGS—High Test & Alloy from Cramp Brass & Iron Foundries Div. o The Baldwin Locomotive Wks., Phila lelphia. chanite Research Institute, Pittsburgh, CASTINGS—Magnesium Alloys American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh. Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich. CASTINGS—Malleable
Lake City Malleable Co., The, 5100
Lakeside Ave., Cleveland.
Peoria (Ill.) Malleable Castings Co. Peoria (III.) Malleable Castings Co.

CASTINGS—Manganese Steel
American Manganese Steel Div. of The
American Brake Shoe & Foundry Co.,
Chicago Heights, III.

Taylor-Wharton Iron & Steel Co., High
Bridge. New Jersey.

CASTINGS—Mechanite Metal
Mechanite Research Institute, Pittsburgh,
Pa. CASTINGS—Monel & Nickel
Cramp Brass & Iron Foundries Div. o
The Baldwin Locomotive Wks., Phila-CASTINGS—Phosphor Bronze
Phosphor-Bronze Smelting Co., The, Philadelphia, Pa. CASTINGS—Steel
Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
American
town, O
Bethlehem Rolling Mill Co., The, Middletown, Ohio.

Bethlehem (Pa.) Steel Company.

Birdsboro (Pa.) Steel Foundry & Machine Co.
Carnegie-Illinois Steel Corp. (U. S. Steel
Corp. Subsidiary), Pittsburgh & Chi-Corp. Subsidiary), Pittsburgh & ChiPago.

Columbia Steel Co. (U. S. Steel Corp.
Subsidiary), San Francisco, Calif.

Continental Roll & Steel Foundry Co.,
East Chicago, Ind.

Crucible Steel Castings Co., Lansdowne, Pa.

Hartford (Conn.) Electric Steel Corp.

Lebanco (Pa.) Steel Foundry.

Mackintosh-Hemphill Co., Pittsburgh

Mesta Mch. Co., Pittsburgh.

Michiana Products Corp., Michigan City,
Ind.

National Fris. (Corp.) Ind.
National-Eric Corp., Eric. Pa.
Ohio Steel Foundry Co., Lima, Ohio.
Standard Steel Wks. Div. The Baldwin Locomotive Works, Phila., Pa.
Strong Steel Foundry Co., Buffalo, N. Y.
Unitcast Corp., Toledo, Ohio.
CASTINGS—Wear Resisting
Mechanite Research Institute, Pittsburgh,
Pa. Pa.
Taylor-Wharton Iron & Steel Co., High
Bridge, New Jersey.
Wall-Colmonoy Corn.. Detroit, Mich. CEMENT—Acid-Proof
Pennsylvania Salt Mfg. Co., Philadelphia, Pa Dhia. Pa CEMENT—Refractory Babcock & Wilcox Co., The, 85 Liberty St., New York City. Carborundum Co., The, Perth Amboy, N. J. Jenns-Manville Corp., 22 East 40th St., New York City. CENTER LAPPING MACHINES
Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich. CENTERING MACHINES Hendey Machine Co., Torri Jones & Lamson Machine CENTERING MACHINES

Hendey Machine Co., Torrington, Conn.

Jones & Lamson Machine Co., Springfield. Vt.

Sundstrand Machine Tool Co., Rockford, Ill.

CHAINS—Conveyor & Elevator

American Manganese Steel Div. of The

American Brake Shoe & Foundry Co.,

Chicago Heights, Ill.

Havi & Patterson, Inc., Pittsburgh.

Jeffrey Mrg. Co., The, Columbus, Ohio.

Link-Belt Co., 220 So. Belmont Ave.,

Indianapolis, Ind.

CHAINS—Power Transmissien

Link-Belt Co., 220 So. Belmont Ave.,

Indianapolis, Ind.

Morse Chain Co., Ithaca, N. Y.

Ramsey Chain Co., Inc., Albany, N. Y.

Whitney Chain & Mrg. Co., Hartford, Ct.

CHAINS-Roller Link-Beit Co., 220 So. Belmont Ave., Link-Belt Co., 220 So. Belmont Ave., Indianapolis, Ind. Morse Chain Co., Ithaca, N. Y. Whitney Chain & Mfg. Co., Hartford, Ct. Whitney Chain & Jaig. Co., CHAINS—Silent Link-Belt Co., 220 So. Belmont Ave., Indianapolis, Ind. Morse Chain Co., Ithaca, N. Y. Whitney Chain & Mfg. Co., Hartford, Ct, CHAINS-Welded
American Chain & Cable Co., Inc., York, CHAIRS—Steel, Office Artility Metal Products, Inc., Elkhart, Ind. Harter Corp., Sturgis, Mich. CHAMFERING MACHINES (Gear) atool Co., The, Dayton, Onto ss Gear & Machine Co., Detroit, Mich. CHANNELS—See Angles, Besms, Chan-nels and Tees CHECKS—Metal Cunningham, M. E., Co., Pittaburgh, Pa. Noble & Westbrook Mfg. Co., The, E. Hartford, Conn. CHEMICALS—Industrial Cowles Detergent Co., The, Cleveland. Cowles Detergent Co., The, Cleveland, Ohlo. Pennsylvania Salt Mfg. Co., Philadel-phia, Pa. CHEMICALS—Rust Proofing
Alrose Chemical Co., Cranston, Prov., R. I.
Parker Rust Proof Co., 2186 Milwaukee
Ave., Detroit. CHROMIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East
42nd St., N. Y. C. CHROMIUM - Plating - See Plating -CHUCKING MACHINES—Automatic Cleveland (Ohio) Automatic Machine Co., leveland (Ohio) Automatic Machine Co., The. oster Div. International Machine Tool Corn.. Elkhart. Ind. ew Britain-Gridley Machine Div.. The New Britain Machine Co., New Britain, Conn. Conn. Otter & Johnston Machine Co., Pawtucket, R. I. CHUCKING MACHINES-Multiple Spindle Machinets—multiple
Baird Mch. Co., The, Bridgeport, Cons.
Goss & DeLeeuw Machine Co., New
Britain, Conn.
National Acme Co., The, Cleveland.
Potter & Johnston Machine Co., Pawtucket,
R. I. CHUCKS—Air Operated Logansport (Ind.) Machine, Inc. Logansport (Ind.) Machine, Inc.

CHUCKS—Drill
Cleveland (Ohio) Twist Drill Co., The.

Cushman Chuck Co., Hartford, Conn.
Millers Falls Co., Greenfield, Mass.

Morse Twist Drill & Mach. Co., New
Bedford, Mass.

North Bros. Mfg. Co., Philadelphia, Pa. CHUCKS—Drill, Quick Change
Apex Machine & Tool Co., The, Dayton, Ohio.

CHUCKS—Electric
Cushman Chuck Co., Hartford, Conn.
CHUCKS—Lathe
Cushman Chuck Co., Hartford, Conn.
Foster Div. International Machine Tool
Coro., Elkhart, Ind. CHUCKS-Magnetic Brown & Sharpe Mfg. Co., Providence, Brown & Sharpe Mig. Co., R. I.
Heald Machine Co., Worcester, Mass.
Täft-Peirce Mfc. Co., The, Woonsocket, B. I.
CHUCKS—Tapping
Apex Machine & Tool Co., The, Dayton, Ohlo.
CIRCLES—Phosphor Bronze
Revere Copper & Brass, Inc., 230 Park
Ave. New York City.
CLAMPS—Toggle & "C" Clamps
Detroit (Mich.) Stamping Co.
CLAY GUNS.
Ballor Wm. M. Co. Pitteburgh, Pa Balley, Wm. M., Co., Pittsburgh, Pa. CLEANERS—Metal American Chemical Paint Co., Ambler, Pa Cowles Detergent Co., The, Cleveland, Cowles Detergent Co., The, Cleveland, Ohio. Ford, J. B., Sales Co., The, Wyandotte, Mich. Mich.
Houghton, E. F., & Co., Philadelphia, Pa.
Oakite Products, Inc., 22 Thames St.,
New York City.
Pennsylvania Sait Mfg. Co., Philadel-Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
CLEANERS, VACUUM—Industrial
Spencer Turbine Co., Hartford, Conn.
CLEANING EQUIPMENT (METAL)—
Electro-Chemical Bullard Co., The. Bridgeport. Conn. CLEANING EQUIPMENT-Metal CLEANING EQUIPMENT—Metal American Foundry Equipment Co., The, 510 S. Byrkit St., Mishawaka, Ind. Hydro-Blast Corp., The, Chicago, Ill. CLOTHING—Asbestos & Fireproof American Ontical Co., Southbridge, Mass. CLUTCH-BRAKES—Magnetie Steams Magnetic Mfg. Co., 635 So. 28th Steams managers.
St., Milwaukee.
CLUTCHES
Fairbanks, Morse & Co., Chicago.
Fella Clutch & Mchry. Co., The, Cuyahoga Falls. Ohlo.

Hilliard Corp., The, Railroad Ave., Elmirs.

N. Y.

Morse Chain Co.. Ithaca, N. Y.

CLUTCHES—Frietion
Dodge Mig. Corp., Mishawaka, Ind.
Twin Disc Clutch Co., Racine, Wis.

CLUTCHES—Magnetic
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Clutches—Magnetic
Clutches—Magnetic CONVEYOR WORMS Lee Spring Co., Inc., 30 Main St., Brook-Cutler-Hammer, Inc., Milwaukee.
Dings Magnetic Separator Co., 728 Smith
St., Milwaukee.
Stearns Magnetic Mfg. Co., 635 So. 28th
St., Milwaukee. CONVEYORS—Gravity
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa. CLUTCHES—Overrunning
Hilliard Corp., The, Railroad Ave., Elmira, CONVEYORS—Monorall
American Monorall Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engg. Co., 1115 East
283rd St., Wickliffe, Ohio. CLUTCHES-Tractor
Twin Disc Clutch Co., Bacine, Wis. Twin Disc Clutter Co., Co., The, Cleveland, Cleveland-Cliffs Iron Co., The, Cleveland, COPING MACHINES Cleveland (Ohio) Punch & Shear Works Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Koppers Coal Co., The, Pittsburgh.
Pickands Mather & Co., Cleveland.
Wieman & Ward Co., The, Pittsburgh, Pa.
COAL, ORE & ASH HANDLING MACHINERY
Heyl & Patterson, Inc., Pittsburgh,
Link-Belt Co., 300 West Pershing Road,
Chicago III Co., The. Schatz Mfg. Co., The. Poughkeepsie, N. Y. CORE GRINDERS—Power Operated
Milwaukee (Wis.) Foundry Equipment Co. Milwaukee (Wis.) Foundry Equipment Co. CORE 01L Houghton, E. F., & Co., Philadelphia, Pa. Penola, Inc., Pittsburgh, Pa. Socony-Vacuum 01l Co., Inc., 26 Broadway, New York City. Sun 01l Co., Philadelphia. Tide Water Associated 01l Co., 17 Battery Place, N. Y. C. Heyl & Patterson,
Link-Belt Co., 300 West Personn
Chicago, Ill.
COBALT METAL
Central Trading Corp., 511 Fifth Ave.,
N. Y. C.
COILING MACHINERY—Wire Spring
Terrington (Conn.) Mfg. Co., The. CORUNDUM WHEELS - See Grinding Torrington (Conn.) Mfg. Co., The.
COILS—Lead
National Lead Co., 111 Bdway., N. Y. C.
COILS—Pipe
Harrisburg (Pa.) Steel Corp.
COILS—Tubing & Pipe
Swan Engineering Co., Inc., Newark, N. J.
COKE—Mctaliurgical
Cleveland-Cliffs Iron Co., The, Cleveland,
Ohio. Wheels
COTTERS AND KEYS—Spring
Hindley Mfg. Co., Valles Falls, B. I.
Hubbard, M. D., Spring Co., 329 Central Ave., Pontiac, Mich.
Lamson & Sessions Co., The, Cleveland.
Western Wire Prods. Co., St. Louis, Mo. Cleveland China and Ohio.

Pickands Mather & Co., Cleveland.

Wieman & Ward Co., The, Pittsburgh, Pa.

COKE OVEN MACHINERY

Koppers Co., Engineering & Construction Western Wire Prods. Co., St. Louis, Mo. COUNTERBORES Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan. Cleveland (Ohio) Twist Drill Co., The. Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich. Galring Tool Co., Detroit Morse Twist Drill & Mch. Co., New Bed ford, Mass. Div., Pittsburgh.

COLD ROLL FORMING MACHINES
McKay Machine Co., The, Youngstown. oder Co., The, Cleveland, Ohia COUNTERS—Production
Streeter-Amet Co., Chicago.
Veeder-Root, Inc., Hartford, Ct. Brothers. Inc., Elmira, New York.
COLLETS—Drill
Aper Machine & Tool Co., The, Dayton, COUNTING MACHINES Veeder-Root, Inc., Hartford, Conn. Ohio.
COLUMBIUM
Electro Metallurgical Sales Corp., 30 E. COUPLINGS-Cut-Off Friction
Hilliard Corp., The, Railroad Ave., Elmira, Electro menaturas. And St., N. Y. C.
COMBUSTION CONTROLS
Recown Instrument Co., The, Philadel-COUPLINGS—Flexible
Ajax Flexible Coupling Co., Westfield, ohia, Pa.
eds & Northrup Co., 4956 Stenton Ave., N. Y.
James, D. O., Mfg. Co., 1120 W. Monros
St., Chicago, Ili.
Koppers Co., Bartlett Hayward Div., Baltimore. Md.
Lovejoy Flexible Coupling Co., 4979 Lake
St., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.
Poole Foundry & Mch. Co., Baltimore. Md. Philadelphia.

organ Construction Co., Worcester, Mass.

orth American Mfg. Co., The, Cleveland, COMPOUNDS—Drawing and Cutting Gulf Oil Corp., Gulf Refining Co., Pitta-Guif Oil Corp., Guif Refining Co., Pittsburgh, Pa., Boughton, E. F., & Co., Philadelphia, Pa., Penola, Inc., Pittsburgh, Pa., Scoeny-Vacuum Oil Co., Inc., 26 Broadway, New York City.
Standard Oil Co., (Indiana), Chicago.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C., COMPOUNDS—Lapping
Carborundum Co., The, Niagara Falls, N. Y. General Abrasive Co., Inc., Niagara Falls, New York. COUPLINGS-Fluid
Twin Disc Clutch Co., Bacine, Wis. Twin Disc Cutter Co., Backing, Wis.

COUPLINGS—Pips
Champion Machine & Forging Co., The,
Cleveland, Ohio.

Harrisburg (Ps.) Steel Corp.
National Tube Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.

CRANES—Crawling Tractor
American Hoist & Derrick Co., St. Paul,
Mins. Mins.
Cullen-Friestedt Co., 1303 S. Kilbourn v York, nal Broach & Machine Co., Detroit, Mich.
COMPRESSORS—Air
COMPRESSORS—Air
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co., 11 Broadway, New Cullen-Friestedt Co., 1395 S. Allouern Ave., Chicago.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohlo Locomotive Crane Co., The, Bucyrus, York City
Spencer Turbine Co., Hartford, Conn.
COMPRESSORS—Rebuilt. (See Clearing
House Section)
CONDENSERS—Surface & Jet
Allis-Chalmers Mfg. Co., Milwaskee, Wis.
Ingersoll-Rand Co., 11 Broadway, New
York City.
Westinghouse Electric & Mfg. Co., East
Pittsburgh, Pa. Ohio Locomotive Crane Co., The, Bucyrus, Ohio.
CRANES — Electric, Industrial, Truck Mounted
Automatic Transportation Co., 75 W. 87th St., Chicago, Ill.
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland. Pittsburgh, Pa.
CONTACTS—Electrical
Mallory, P. R., & Co., Inc., Indianapolis. CRANES-Electric Traveling CRANES—Electric Traveling
Armel, James P., Pittsburgh,
Cleveland Crane & Engineering Co., 1115
East 283rd St., Wickliffe, Ohio.
Cleveland Tramrall Div. of The Cleveland
Crane & Engng, Co., 1115 East 283rd
St., Wickliffe, Ohio,
Buelid Crane & Hoist Co., The, Euclid. O.
Harnischfeger Corp., 4401 W. National
Ave., Milwaukee, Wis.
Morgan Engineering Co., The, Alliance, O.
Northern Engineering Works, Detroit,
Mich. Ind.
CONTRACTORS—Iron and Steel Industry
McKee, Arthur G., & Co., Cleveland, Ohio.
CONTRACTORS' SUPPLIES — SecondHand, (See Clearing House Section)
CONTROL SYSTEMS—Temperature
Leeds & Northrup Co., 4956 Stenton Ave.,
Philadelphia Philadelphia.
CONTROLLERS—Crane
Clark Controller Co., The, Cleveland.
Culter-Hammer, Inc., Milwauke.
Electric Controller & Mfg. Co., The, Ave., Milwaukee, Wis.
Morgan Engineering Co., The, Alliance, O.
Northern Engineering Works, Detroit,
Mich.
Mich.
Reading (Pa.) Chain & Block Corp.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Div. Manning,
Maxwell & Moore, Inc., 402 Broadway
Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.
CRANES—Gantry
Cleveland Crane & Engineering Co., 1115
East 283rd St., Wickliffe, Ohio.
Dravo Corp., Engineering Wks. Div.
Plitsburgh.
Harnischfeger Corp., 4401 W. National
Ave., Milwaukee.
Morgan Engineering Co., The, Alliance, O.
Shaw-Box Crane & Hoist Div. Manning
Maxwell & Moore, Inc., 402 Broadway
Muskegon, Mich.
Shepard Niles Crane & Hoist Corp.
Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.
CRANES—Hand Power
American Monorail Co., The, Cleveland
Cleveland Crane & Engineering Co., 1115
East 283rd St., Wickliffe, Ohio. Electric Controller Signature Signature Signature Clark Controller Co., The. Cleveland. Cutler-Hammer. Inc., Milwaukee, Electric Controller & Mfg. Co., The. General Electric Co., Schenectady, N. Y. CONTROLLERS—Valve, Electrically Operated
Brown Instrument Co., The, Philadelphia, Pa.
Zutler-Hammer, Inc., Milwaukee.
Leeds & Northrup Co., 4956 Stenton Ave.,
Philadelphia Philadelphia.

CONTROLS—Time Cycle
Koppers Co., Bartlett Hayward Div., Baltimore. Md.
CONVEYING AND ELEVATING MACHINERY

CHINERY
Heyl & Patterson, Inc., Pittsburgh,
Jeffrey, Mfg., Co., The, Columbus, Ohio.
Link-Belt Co., 300 West Pershing Road,
Chicago, Ill.
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.

Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., 1115 East 283rd St., Wickliffe, Ohio. Buclid Crane & Hoist Co., The, Euclid. O. Harnischleger Corp., 4401 W. National Ave., Milwaukee. Industrial Brownhoist Corp., Bay City, Mich.

Mich.
Nu. Pern Engineering Works, Detroit.
Reading (Pa.) Chain & Block Corp.
Shaw-Box Crane & Hoist Div. Manning,
Maxwell & Moore, Inc., 402 Broadway,
Muskegon, Mich.
Shepard Niles Crane & Hoist Corp.,
Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.
CRANFS.—Ith

Whiting Corp., Harvey, III.
CRANES—Jib
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland
Crane & Engineering Co., 1115 East
283rd St., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The. Buelid, O.
Shaw-Box Crane & Hoist Div. Manning.
Maxwell & Moore, Inc., 402 Broadway,
Muskegon, Mich.
Whiting Corp.. Harvey, III.

CRANES-Locomotive American Hoist & Derrick Co., St. Paul, American Holst & Derrick Co., Minn.

Cullen-Friestedt Co., 1303 S. Kilbourn

Cullen-Friestedt Co., 1303 S. Khibouhi Ave., Chicago. Harnischfeger Corp., 4401 W. National Ave., Milwauke. Industrial Brownhoist Corp., Bay City. Mich. Ohio Locomotive Crane Co., The, Bucyrus, O.

Ohio Locomotive Crane Co., The, Bucyrus, O. CRANES—Monorall Co., The, Cleveland. American Monorall Co., The, Cleveland Cleveland Tramrall Div. of The Cleveland Crane & Engng. Co., 1115 East 283rd St., Wickliffe, Ohio.
Buclid Crane & Hoist Co., The, Euclid, O. Northern Engineering Works, Detroit. Reading (Pa.) Chain & Block Corp. Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

GRANES—Portable
Canton Foundry & Mach. Co., The, Div.
of The Hill Acme Co., 6400 Breakwater
Ave., Cleveland, Ohio.

CRANES—Portable Electric
Automatic Transportation Co., 75 W. 87th
St., Chicago, Ill.
Baker-Raulang Co., The, 2175 W. 25th
St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANKSHAFTS
Transue & Williams Steel Forging Corp.,
Alliance, Ohio.
Union Drawn Steel Div. Republic Steel
Corp., Massillon, Ohio.

Corp., Massillon, Ohio.

CRANKSHAFTS—Forged

Bay City Forge Co., Erie, Pa.

Midvale Co., The, Nicetown, Phila., Pa.

CRUSHERS—Coal
American Pulverizer Co., 1439 Macklind
Ave., St. Louis, Mo.

Ave., St. Louis, Mo.

CRUSHERS—Steel Turnings

American Pulverizer Co., 1439 Macklind

Ave., St. Louis, Mo.

Jeffrey Mfg. Co., The, Columbus, Ohio.

CUPOLA CHARGING EQUIPMENT

Atlas Car & Mfg. Co., The, Cleveland,

Ohio. Ohio.

Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.

CUTTERS & BURRS—Diemakers'
Chicago (Ill.) Wheel & Mfg. Co., 1101 W.

Monroe St.
CUTTERS—Die Sinking
Pratt & Whitney Div. Niles-Bement-Pond
Co., West Hartford, Conn.,
Tomkins-Johnson Co., The, Jackson, Mich.
CUTTERS—Grinding Wheel—see Dressers
—Grinding Wheel

Grinding Wheel
CUTTERS—Keyseating
Davis Keyseater Co., 400 Exchange St.
Rochester, N. Y.
CUTTERS—Milling
Brown & Sharpe Mfg. Co., Providence, R. I.
Carboley Co., Inc., 11153 East 3-Mile
Road, Detroit, Michigan.
Cleveland (Ohio) Twist Drill Co., The.
Gairing Tool Co., The, Detroit,
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div, Niles-Bement-Pond
Co., West Hartford, Conn.
Victor Machinery Exchange, 251 Centre
St., N. Y. C.

CUTTING COMPOUNDS
Oakite Products, Inc., 22 Thames St.,

New York City.

CUTTING-OFF MACHINES—Abrasive
Tabor Mfg. Co.. Phila.

CUTTING-OFF MACHINES—Cold Saw
Expen-fucas Mch. Wks.. Philadelphia.

CUTTING-OFF MACHINES—Fige or
Tubing
Actna-Standard Engineering Co., The,
Youngstown, Ohio.

Bardons & Oliver. Inc.. Cleveland.

Cox & Sons Co., The, Bridgeton, N. J.

Landis Mch. Co.. inc.. Waynesboro, Pa.

CUTTING OFF WHEELS

Carborundum Co., The Ningara Falls, N. Y.

CUTTING AND WELDING APPARATUS

—Oxy-Acetylene—See Welding and Cutting Machines and Equipment—OxyAcetylene.

CYLINDERS-Compressed Gas, Air & Hy-

CYLINDERS—Compressed uss, Air & my-drautic
Hannifin Mfg. Co., Chicago, Ill.
Logansport (Ind.) Machine, Inc.
Oligear Co., The, 1311 W. Bruce St.,
Milwaukee, Wis.
Taylor-Wharton Iron & Steel Co., High
Bridge, N. J.
Tomkins-Johnson Co., The, Jackson, Mich.

CYLINDERS—Seamless
Harrisburg (Pa.) Steel Corp.
Midvale Co., The, Nicetown, Phila., Pa.
National Tube Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.
Taylor-Wharton Iron & Steel Co., High
Bridge, N. J.

DEGREASING COMPOUNDS
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

DEOXIDIZERS
Vanadium Corp. of America, 420 Lexington
Ave., New York City.

DESIGNING & DEVELOPING Torrington (Conn.) Mfg. Co., The. DIE CASTING MACHINES

Boad-Proving Corp., Worcester, Mass.

DIE—Hard Carbide Inserts
McKenna Metals Co., Latrobe, Pa. DIE SINKING MACHINES -

and Hand Cincinnati (Ohio) Milling Mch. Co., The. Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn. DIEING MACHINES—Automatic
Henry & Wright Mfg. Co., The, Hartford,

DIES, JIGS, FIXTURES, etc. Taft-Peirce Mfg. Co., The, Woonsocket, R. I. DIES-Bolt Sizing Vascoloy-Ramet Corp., North Chicago, Ill. DIES—Cast Tool Steel
Advance Foundry Co., The, Dayton, Ohio,

Advance Foundry Co., The, Dayton, Ohio, DIES—Drawing & Sizing Budd. Edward G., Mfg. Co., Philadelphia, Pa. Co., Inc., 11153 East 8-Mila Road. Detroit. Michigan. DIES—Pipe Threading Greenfield (Mass.) Tap & Die Corp. Landis Mch. Co., Inc., Waynesboro. Pa. Murchey Machine & Tool Co., Detroit Mich. National Acme Co., The, Claveland.

DIES-Resistance Welding Mallory, P. R., & Co., Inc., Indianapolis,

Ind.

DIES—Serew and Thread Cutting
Eastern Mach, Screw Corp., New Haven, Ct,
Geometric Tool Co., The, New Haven, Conn.
Greenfield (Mass.) Tap & Die Corp.
Jones & Lamson Mch. Co., Springfield.
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit,
Mich.
National Acme Co., The, Cleveland.

DIES—Self, Opening, Adjustable.

DIES—Self-Opening Adjustable
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Geometric Tool Co., The, New Haven, Conn,
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesbore, Pa.
Murchey Machine & Tool Co., Detroit,
Mich Murchey Machine & Tool Co., Detroit, Mich. National Acme Co., The, Cleveland, Ohio.

DIES—Sheet Metal Working
Budd, Edward G., Mfg. Co., Philadelphils, Ps.
Cimatool Co., The, Dayton, Ohio.
Worcester (Mass.) Stamped Metal Co., 6
Hunt St.

DIES—Steel Marking Cunningham, M. E., Co., Pittaburgh, Pa. Noble & Westbrook Mfg. Co., The, E. Hartford, Conn. DIES-Wire Drawing Vascoloy-Ramet Corp., North Chicago, Ill.

DIESEL FUEL INJECTORS
Ex-Cell-O Corp., 1210 Oakman Blvd., De-

DOORS & SHUTTERS, Fireproof Kinnear Mfg. Co., Columbus, Ohio. Name at Mig. Co., Columbus, Ohl DOORS & SHUTTERS — Steel or Rolling Kinnear Mig. Co., Columbus, Ohlo. Mon. R. C., Co., Detroit, Mich. DRAFTING ROOM FURNITURE Pease, C. F., Company. The, 269

ease, C. F., Company, The, Irving Pk. Road, Chicago, Ill. DRAW BENCHES
McKay Machine Co., The, Youngstown,

Ohio.

DRAWN WORK—Metal—See Stampings or Drawings—Metal

DRESSERS—Grinding Wheel
Carboloy Co., Inc., 41158 E. 8-Mile Rd.,
Detroit, Mich.

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Rotor Tool Co., The, Cleveland, Ohlo,
Warner & Swasey Co., The, Cleveland. DRILLING MACHINES—Radial Bryant Machinery & Engineering Co. Bryant Machinery & Engineering Co., Chicago. Cincinnati (Ohio) Bickford Tool Co., The. Cleveland (Ohio) Punch & Shear Works DRILLING MACHINES—Sensitive Buffalo (N. Y.) Forge Co., 492 Broadway, Leland-Gifford Co., Worcester, Mass. DRILLING MACHINES—Vertical Bryant Machinery & Engineering Co., ryant Machines, Chicago. Incinnati (Ohio) Bickford Tool Co., The. Isereman Mch. Tool Co., Green Bay, DRILLING MACHINES-Wall Radial DRILLS-Hand & Breast North Bros. Mfg. Co., Philadelphia, Pa. North Bros. Mrg. Co., Philadelphia, Pa. DRIVES—Gear Farrel-Birmingham Co., Inc., Buffalo, N. Y. Mesta Mch. Co., Pittsburgh. DRIVES—Single & Multiple V-Beits Allis-Chalmers Mfg. Co., Milwaukee. DROP FORGINGS—See Forgings—Drop iron or Steel DROP HAMMERS-See Hammers-Drop DUPLICATING MACHINES
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American Blower Corp., 6000 Russell St.,
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American Foundry Equipment Co., The, Detroit, Mich.
American Foundry Equipment Co., The,
510 S. Byrkit St., Mishawaka. Ind.
Mahon, R. C., Co., Detroit, Mich.
Pangborn Corporation, Hagerstown, Md.
Whiting Corp., Harvey, Ill. Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C. St., N. Y. C

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Ready-Power Co., The, Detroit, Mich.
ELECTRIC LIGHTING—Industrial
Fleur-O-Lier Manufacturers, Cleveland, O.
General Electric Co., Lamp Dept., Neia
Park, Cleveland.
Westinghouse Electric & Mfg. Co., Lighting Div., Cleveland, Ohio. ELECTRIC WELDING - See Welding -ELECTRICAL EQUIPMENT Allis-Chalmers Mfg. Co., Milwaukee. ELECTRICAL MACHINERY - Second Hand. (See Clearing House Section) ELECTRICAL WIRES
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Mallory, P. R., & Co., Inc., Indianapolis,
Ind. ELECTRODES—Stainless Steel Arcos Corp., Philadelphia, Pa. Arcos Corp., Philadelphia, Pa.
ELECTRODES—Welding, Coated
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Harnischfeger Corp., 4401 W. National
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Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Una Welding, Inc., Cleveland, Ohio. Una Welding, Inc., Cleveland, Ohio.

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United Chromium Incorporated, 51 East

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McKee, Arthur G., & Co., Cleveland, Ohio.
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Koppers Co., Engineering & Construction
Div., Pittsburgh. Div., Pittsburgh.

ENGINEERS—Consulting Management

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Trundle Engineering Co., Cleveland, Ohio. ENGINES—Diesel
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N. J. FLANGES-Welded Steel King Fifth Wheel Co., 2915 N. Second FANS—Crane Cab Perkins, B. F., & Son, Inc., Holyoke, FANS-Man Cooling Perkins, B. F., & Son, Inc., Holyoke, FANS—Portable Perkins, B. F., & Son, Inc., Holyoke Mass,
FANS—Ventilating
American Blower Corp., 6000 Russell St.,
Detroit, Mich.
Buffalo (N. Y.) Forge Co., 492 Broadway.
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FEEDS—Hydraullc, for Machines
American Engineering Co., Philadelphia.
Oligear Co., The, 1311 W. Bruce St., MilWaukee.
FELT—Wool Mechanical
American Felt Co.,315 Fourth Ave., N.Y.C. FENCING—Wire
Atlas Fence Co., Philadelphia, Pa.
Pittsburgh (Pa.) Steel Co. Pittsburgh (Pa.) Steet Co.

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Climax Molya-Senum Co., 500 Fifth Ave.,
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Electro Metallurgical Sales Corp., 20 E.
42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Titanium Alloy Mfg. Co., The, Niagara
Falls, New York.
Vanadium Corp. of America, 420 Lexington
Ave., New York City.
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Chromium Mining & Smelting Corp., Ltd.,
Hamilton, Canada.
Electro Metallurgical Sales Corp., 30 E.
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Vanadium Corp. of America, 420 Lexington
Ave., New York City. Ave., New York City.
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Electro Metallurgical Sales Corp., 30 E.,
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Oglebay, Norton & Co., Cleveland, Ohio,
Ohio Ferro-Alloys Corp., Canton, Ohio.
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Vanadium Corp., of America, 420 Lexington
Ave., New York City. FERROSILICON ALUMINUM
Vanadium Corp. of America, 420 Lexington York City. Titanium Alloy Mfg. Co., The, Niagara Falls, New York.
Vanadium Corp. of America, 420 Lexington Ave., New York City. FERROVANADIUM

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Vanadium Corp. of America, 420 Lexington
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Continental-Diamond Fibre Co., Newark,
Delaware. Piles & RASPS
Atkins, E. C., & Co., 406 So. Illinois
St., Indianapolis, Ind.
Nicholson File Co., Providence, B. I. FILING MACHINES
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Johns-Manville Corp., 22 East 40th 8t.
New York City. FILTERS-Air Whiting Corp., Harvey, Ill. FILTERS-OII
National Acme Co., The, Cleveland.

FLANGING WORK—Carbon and Alloy Worth Steel Co., Claymont, Del. FLEXIBLE SHAFT EQUIPMENT Lovejoy Flexible Coupling Co., 4979 Lake St., Chicago, Ill. Strand, N. A., & Co., Chicago. FLOODLIGHTS—Acetylene Linde Air Products Company, The, 80 East 42nd St., N. Y. C. FLOOR (CONCRETE) Repair Materials Flexrock Co., 2328 Manning St., Phila-FLOOR PLATES—See Plates—Floor of FLOORING-Acid Proof Pennsylvania Salt Mfg. Co., Philadelphia, FLOORING-Monolithie arey, Philip, Co., The, Cincinnati, Ohio, ohins-Manville Corp., 22 East 40th St. New York City. LOORING-Open Steel law-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Borden Metal Products Co., Elizabeth,
New Jersey,
Dravo Corp., Engineering Wks. Div., New Corp., Enginees...
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Co. The, Cleveland, Ohio. FORGINGS-Alloy Steel National Forge & Ordnance Co., Irvine, Pa. FORGINGS-Aluminum Aluminum Co. of America, Pittsburgh. FORGINGS—Brass, Bronze or Copper American Brass Co., The, Waterbury, Conn. Commonwealth Brass Corp., Detroit. Cramp Brass & Iron Foundries Div. of The Baldwin Locomotive Wks., Philadelphia.

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Revere Copper & Brass, Inc., 230 Park

Ave., New York City.

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Alliance, Ohio. FORGINGS—Coin Pressed Rockford (Ill.) Drop Forge Co. \*\*TORGINGS—Drop. iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Canton (Ohio) Drop Forging & Mfg. Co.
Carnegie-Illinois Steel Corp. (U. S. Steel
Corp. Subsidiary), Pittsburgh & Chi-Cleveland. Ohio.

Herbrand Corp., The, Fremont, Ohio.
Poor & Co., Canton Forge & Axle Wks.,
Canton, Ohio cago. nampion Machine & Forging Co., The Poor & Co., Canton and Canton, Ohio
Canton, Ohio
Rockford (III.) Drop Forge Co.
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Alliance, Ohio.
Wilcox, D., Mfg. Co., Mechanicaburg, Pa,
Williams, J. H., & Co., Buffalo, N. Y. FORGINGS—Hammered Vulcan Steam Forging Co., Buffalo, N. Y. FORGINGS—Hollow Harrisburg (Pa.) Steel Corp. Midvale Co., The, Nicetown, Phila., Pa. National Forge & Ordnance Co., Irvine, Pa. FORGINGS—Hollow Bored American Hollow Boring Co., 1912 Rasp-berry St., Erie, Pa. berry St., Erie, Pa.

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Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Atlas Drop Forge Co., Lansing, Mich.
Bay City Forge Co., Erie, Pa.
Bethlehem (Pa.) Steel Company,
Mesta Mch. Co., Pitisburgh.
Midvale Co., The, Nicetown, Phila., Pa.
National Forge & Ordnance Co., Irvine, Pa
Standard Steel Wks. Div. The Baldwin
Locomotive Works, Phila., Pa.
Taylor-Wharton Iron & Steel Co., High
Bridge, N. J.
FORGINGS—Missachim Alleys. FORGINGS—Magnesium Alloys American Magnesium Corp., 1701 Gulf Bidg., Pittsburgh. Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich. FIRE BRICK
Babcock & Wilcox Co., The, 85 Liberty St.,
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Carborundum Co., The Perth Amboy, N. J. FORGINGS—Tool Steel Vulcan Steam Forging Co., Buffalo, N. Y. FORGINGS—Upset
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Lamson & Sessions Co., The, Cleveland.
Rockford (Ill.) Drop Forge Co.
Standard Tube Co., The, Detroit, Mich. FIRE BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty
St., N. Y. C. Jeffrey Mfg. Co., The, Columbus, Ohio, Whiting Corp., Harvey, Ill.

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Taylor-Wharton Iron & Steel Co., High
Bridge, N. J. Illinois Clay Products Co., Joliet, III.

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Commonwealth Brass Corp., Detroit, Mich.

FITTINGS—Welding
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FLANGES—Forged Steel
Harrisburg (Pa.) Steel Corp.

Standard Steel Wks. Div. The Baldwin
Locomotive Works, Phila., Pa. FURNACE CONTROLS—Automatic Amsler-Morton Co., The, Pittsburgh, Pa.

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Stewart Furnace Div., Chicago Flexible
Shaft Co., Chicago. Shaft Co., Chicago.
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American Bridge Co. (U. S. Steel Corp.
Bubbidlery). Pittsburgh Div. Kuhlman
Electric Furnace Div. Kuhlman
Electric Co., Bay City, Mich.
Pittsburgh Pa.) Lectromelt Furnace Corp.
Swindell-Dressler Corp., Box 1888, Pittsburgh, Pa. burgh, Pa.

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Electric Furnace Co., The, Salem, Ohio,

General Electric Co., Schenectady, N. X.

FURNACES—Ferging

Drever Co., The, Philadelphia, Pa.

Electric Furnace Co., The, Salem, Ohio. Drever Co., The, Philadelphia, Pa.
Electric Furnage Co., The, Salem, Ohio.
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De FURNACES—Heat Treating, Automatic American Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
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Wean Engineering Co., Inc., Warren,
Ohio, FURNACES-Heat Treating, Controlled FURNACES—Heat Treating, Controlled Atmosphere
Lindberg Engineering Co., 228 North
Laffin St., Chicago, Ill.

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Electric Furnace Co., The, Salem, Ohio.
General Electric Co., Schenectady, N. Y.
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Hoskins Mfg. Co., Detroit, Mich.
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Philadelphia.
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Laffin St., Chicago, III.
Rockwell, W. S., Co., 50 Church St., N.Y.C
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Drever Co., The, Philadelphia, Pa.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Johnson Gas Appliance Co., Cedar Rapids,
Iowa. Iowa.
Lindberg Engineering Co., 228 North
Laffin St., Chicago, Ill.
Pennsylvania Industrial Engineers, Pittsennsylvania Industrial Engineers, Pitts-burgh.
Salem (Ohlo) Engineering Co.
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Electric Co.. Bay City. Mich.
Johnson Gas Appliance Co., Cedar Rapids. FURNACES—Open Hearth Plants
Amsler-Morton Co., The, Pittsburgh, Pa.
McKee, Arthur G., & Co., Cleveland, Ohio. FURNACES—Pack Heating Sheets
Actna-Standard Engineering Co., The.
Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren,
Ohio. FURNACES—Rivet Heating, Gas
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Lindberg Engineering Co., 228 North Laffin St., Chicago, III.
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Vanizing
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Salem (Ohio) Engineering Co.
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Shemied Gago Corp., Dayton, Ohio.

GAGES—Plug and Snap
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Pratt & Whitney Div. Niles-Bement-Pond
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Millers Falls Co., Greenfield, Mass.
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GALVANIZING COMPOUNDS
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Youngstown, Ohio.

The.

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own, Ohi Eric (Pa.) Foundry Co.

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Leeds & Northrup Co., 4956 Stenton Ave.
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Michigan Tool Co., Detroit, Mich.

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Gleason Works, Rochester, N. Y.

Hartford (Conn.) Special Machinery Co.

The.

James, D. O., Mfg. Co., 1120 W. Monroe

St., Chicago, Ill.

National-Eric Corp., Eric, Pa.

Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

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Gleason Works, Rochester, N. Y. Gleason Works, Rochester, N. Y.

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Continental Roll & Steel Foundry Co.,
East Chicago, Ind.
James, D. O., Mfg. Co., 1120 W. Monroe
St., Chicago, Ill.
Lewis Foundry & Machine Div. of BlawKnox Co., Pittsburgh.
United Engineering & Fdry, Co., Ptgh.

GEAR LAPPING MACHINES
Michigan Tool Co., Detroit, Mich.
National Broach & Machine Co., Detroit, Mich.

Mich.

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General Electric Co., Schenectady, N. Y.
James, D. O., Mfg. Co., 1120 W. Monroe
St., Chicago, III.

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GEAR TESTING MACHINES National Broach & Machine Co., Detroit Mich.

GEAR TOOTH BURRING MACHINES
Cross Gear & Machine Co., Detroit, Mich.
GEARS—Bevel
Gleason Works, Rochester, N. Y
James, D. O., Mfg. Co., 1120 W. Monroe
St., Chicago, III.
National-Eric Corp., Eric. Pa.

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Simonos Gear & Mag. Co., Anthrope Gear Rs—Herringhone
Farrel-Birmingham Co., Inc., Buffaio, N.Y.
James, D. O., Mig. Co., 1120 W. Monroe
St., Chicago, Ill.
Mesta Mch. Co., Pittsburgh.

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GEARS—Machine Cut
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James, D. O., Mfg. Co., 1120 W. Monroe
St., Chicago, Ill.
National-Eric Corp., Eric, Pa.
Simonds Gear & Mfg. Co., Pittsburgh.
GEARS—Machine Molded
Poole Foundry & Mch. Co., Baitimore, Md.
GEARS—Non-Metallie
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Continental-Diamond Fibre Co., Newark,
Delaware.
James, D. O., Mfg. Co., 1120 W. Monroe

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GEARS—Rawhide Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

1306 Elston Ave.

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Twin Disc Clutch Co., Racine, Wis. GEARS—Reverse Marine Twin Disc Clutch Co., Racine, Wis.

GEARS—Spur James, D. O., Mfg. Co., 1120 W. Monroe St., Chicago, 1il. Simonds Gear & Mfg. Co., Pittsburgh.

GEARS—Teeth Ground Hartford (Conn.) Special Machinery Co.,

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Linde Air Products Company, The, 30 East
42nd St., N. Y. C.
Milburn Alexander Co., The, Baltimore,
Md.

Md.
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Fairbanks, Morse & Co., Chicago, Ili.
General Electric Co., Schenectady, N. Y.
Hobart Bros., Troy, Ohio.
Lincoln Electric Co., The, Cleveland.
Westinghouse Elec. & Mfg. Co., East Ptgh.

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Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

burgh.
Penola. Inc. Pittsburgh.
Penola. Inc. Pittsburgh.
Pure Oil Co., The, Chicago.
Shell's Industrial Lubricants Div., Shell
Bldg., San Francisco, Shell Bldg.,
St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway.
New York City.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St.,
N. Y. C.
Tide Water Associated Oil Co., 17 Rattery
Place, N. Y. C.

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Mundt, Chas., & Sons. 59 Fairmount
Ave., Jersey City, N. J.

Ave., Jersey City, N. J.

GRILLES—Perforated Metal
Dlamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., The,
Chicago.
Mundt, Chas., & Sons. 59 Fairmount
Ave., Jersey City, N. J.

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Ex-Cell-O Corp., 1210 Oakman Bivd., Detroit. Mich.

troit, Mich.

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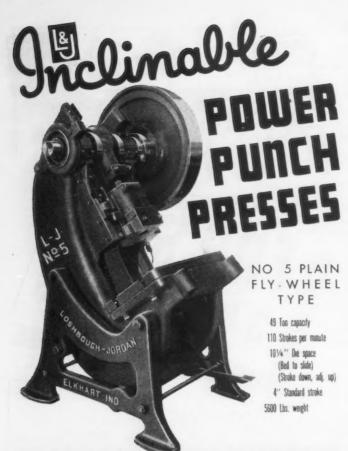
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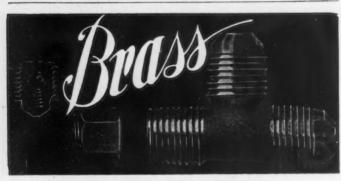


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Gallmeyer & Livingston Co., Grand
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LeBlond, R. K., Machine Tool Co., Cin-

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Jones & Lamson Machine Co., Spring-

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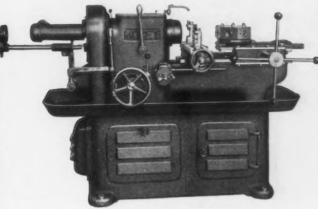
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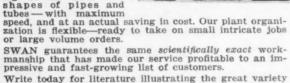
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METAL SPECIALTIES
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III.

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Morey Machinery Co., Inc., 410 Broome St. New York City.

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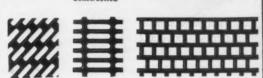
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Albert & Davidson Pipe Corp., 2nd Ave.,
30-51st St., Bklyn., N. Y.
Greenpoint Iron & Pipe Co., Inc., 340
Stagg St., Bklyn., N. Y.
Greenpoint Iron & Pipe Co., Inc., 340
Rate St., Bklyn., N. Y.
PIPE—Seamless Brass or Copper
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park
Ave., New York City.
PIPE—Seamless Steel
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
PIPE—Spiral Welded
American Rolling Mill Co., The, Middletown, Ohio.
PIPE—Standard, Black and Galvanized
Betthelmen (Pa.) Steel Company. Wood, R. D., & Co., Philadelphia, Pa. PiPE—Lead
National Lead Co., 111 Bdway., N. Y. C. PiPE—Lead Lined
National Lead Co., 111 Bdway., N. Y. C. PiPE—New and Second-Hand
Aibert & Davidson Pipe Corp., 2nd Ave., 30-51st St., Bklyn., N. Y.
Greenpoint Iron & Pipe Corp., 2nd Ave., 20-51st St., Bklyn., N. Y.
PiPE—Seamless Brass or Copper
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park
Ave., New York City.
PiPE—Seamless Steel
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
PiPE—Spiral Welded
American Rolling Mill Co., The, Middle-town, Ohio.
PiPE—Standard, Black and Galvanized
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Jones & Laughlin Steel Corp., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Subsidiary, Pittsburgh

Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.
Wheeling (W. Va.) Steel Corp.
PiPE—Weided, Electric
National Tube Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh,
Republic Steel Corp., Cleveland, Ohio.
PiPE GOVERING—Ashestes
Johns-Manville Corp., 22 East 40th St.,
New York City.

Jarecki Mfg. Co., Erie, Pa. PIPE MILL MACHINERY Yoder Co., The, Cleveland, Ohio, PIPE THREADING & CUTTING MA-CHINES
Actna-Standard Engineering Co., The, Youngstown, Ohio, Cox & Sons Co., The, Bridgeton, N. J. Jarecki Mfg. Co., Erie, Pa., Landis, Mach. Co., Inc., Waynesboro, Ps. Murchey Machine & Tool Co., Detroit, Mich.

Taylor-Wilson Mfg. Co., McKees Bocks, Pa. PISTON RINGS Koppers Co.

PISTON RINGS

Koppers Co., American Hammered Piston Rings

Koppers Co., American Hammered Piston Ring Div., Baltimore, Md.

PLANERS

Cincinnati (Ohio) Pianer Co.

Sellers, William, & Co., Inc., 1620 Hamilton St., Philadelphia, Pa.

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Cleveland (Ohio) Punch & Shear Works

Co., The.

Sellers, William, & Co., Inc., 1620 Hamilton St., Philadelphia, Pa.

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Cleveland (Ohio) Punch & Shear Works

Co., The.

Espen\_Lucas Mch. Wks. Philadelphia

Co., The.
Espen-Lucas Mch. Wks., Philadelphia.
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PLATER'S CLEANING COMPOUND American Chemical Paint Co., Ambler, I Cowles Detergent Co., The, Clevela Ohio.

PLATES—Floor or Cellar Door Alan Wood Steel Co., Conshohocken, Pa. Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago. Inland Steel Co., Chicago.

Inland Steel Co., Chicago.

PLATES—Ground & Polished

Holliday, W. J., & Co., Hammond, Ind.

PLATES—Iron or Steel

Alan Wood Steel Co., Conshohocken, Pa.

American Rolling Mill Co., The, Middletown, O.

Bethlehem (Pa.) Steel Company,

Carnegie-Illinois Steel Corp. (U. S. Steel

Corp. Subsidiary), Pittsburgh & Chicago.

Corp. (U. S., Steel Corp. (U. S., Steel Corp. Subsidiary), Pittsburgh & Chicago.

Holliday, W. J., & Co., Hammond, Ind. Inland Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh, liverson, Joseph T., & Son, Inc., Chicago. Tennessee Coal, Iron & Railroad Co., (U. S. Steel Corp., Subsidiary), Birmingbam, Ala.

Houngstown (Ohio) Sheet & Tube Co., The PLATES—Speed Case Steel Holliday, W. J., & Co., Hammond, Ind. PLATING—Cadmium Meaker Co., The, Chicago, Ill.

PLATING—Chromium United Chromium Chromographic Co., The, Chicago, Ill.

PLATING—Cine Meaker Co., The, Chicago, Ill.

PLATING—Tine Meaker Co., The, Chicago, Ill.

PLATING—Tine Meaker Co., The, Chicago, Ill.

PLATING—Tine Meaker Co., The, Chicago, Ill.

PLATING—Zinc
Meaker Co., The, Chicago, Ill.
PLATING EQUIPMENT—All Metals
Meaker Co., The, Chicago, Ill.
PLUGS—Core Hole
Hubbard, M. D., Spring Co., 329 Central
Ave., Pontiac, Mich.
POLISHING GRAIN
Abrasive Co., Philadelphia, Pa.
General Abrasive Co., Inc., Niagara Falls,
New York.

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Transue & Williams Steel Forging Corp., Alliance, Ohio.
Whitehead Stamping Co., 1669 W. Lafayette Bivd., Detroit, Mich.

ette Blvd., Detroib, Mich.
PRESSED STEEL PARTS
Budd. Edward G., Mfg. Co., Phila., Pa.
Flower. Arch T., Cheshnut Hill, Pa.
Koch. George. Sons, Inc., Evansville, Inc.
Lansing (Mich.) Stamping Co., So. Penn Ave.
Parish Pressed Steel Co., Reading, Pa.
Stanley Works. The, New Britain, Conn.
Transue & Williams Steel Forging Corp.,
Alliance, Ohio.

PRESSES—Automatic
Cleveland (Ohio) Punch & Shear Works Cleveland (Ohio) Punch & Shear Works Co., The. Henry & Wright Mfg. Co., The, Hartford, Conn. Niagara Mch. & Tool Wks., Buffalo, N. Y.

AVIAGERS MCD. & Tool Wks., Buffalo, N. Y. PRESSES—Baling Baldwin-Southwark Div. Baldwin Locomotive Wks., Philadelphia, McKay Machine Co., The, Youngstown, Ohio.

PRESSES—Briquetting—Metal Turnings Milwaukee (Wis.) Foundry Equipment Co PRESSES—Broaching
Oilgear Co., The, 1311 W. Bruce St.,
Milwaukee, Wis.

PRESSES—Coining Cleveland (Ohio) Punch & Shear Works (O., The. Farquhar, A. B., Co., Ltd., York, Pa. Hydraulic Press Mfg. Co., The, Mb. Gillead, Ohio, Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Die Sinking
Farquhar, A. B., Co., Ltd., York, Pa.
Hydraulie Press Mfg. Co., The, Mt. Gileud.

Ohio.

PRESSES—Drawing
Baldwin-Southwark Div. Baldwin Locomotive Wks., Philadelphia.
Cleveland (Ohio) Punch & Shear Works
Co., The,
Farqubar, A. B., Co., Ltd., York, Pa.
Hydraulic Press Mfg. Co., Tae, Mt. Gilead,
Ohio.

Lake Eric Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.

Sta., Buffalo, N. Y.

PRESSES—Drop—See Hammers—Drop

PRESSES—Embossing

Farquhar, A. B., Co., Ltd., York, Pa.

Harris-Seybold-Potter Co., Dayton, Ohio.

PRESSES—Extrusion

Baldwin-Southwark Div. Baldwin Locomotive Wks., Philadelphia.

Cleveland (Ohio) Punch & Shear Works

Co., The,

Hydraulic Press Mfg. Co., The, Mt., Gilead,

Ohio.

Ohio.
PRESSES—Foot
Baird Mch. Co., The, Bridgeport, Conn.
Niagara Machine & Tool Works, Buffalo.
N. Y.

Waterbury (Conn.) Farrel Foundry & Mawateroury (Conn.) Farrel Foundry & Machine Co., The.
PRESSES—Forging
Ajax Mfg. Co.. The, Cleveland, Ohio.
Chambersburg (Pa.) Engineering Co.
Cleveland (Ohio) Punch & Shear Works
Co., The.

Co., The.

Farquhar, A. B., Co., Ltd., York, Pa.

Hydraulic Press Mfg. Co., The, Mt. Gilead,
Ohio.

Hydraulie Press Mfg. Co., The, Mt. Gliead, Ohio.

Mesta Mch. Co. Pittsburgh.

Morgan Engineering Co., The, Alliance. O.

Watson-Stillman Co., The, 103 Aldene Road, Roselle, N. J.

PRESSES—Forming and Bending

Baldwin-Southwark Div. Baldwin Locomotive Wks. Philadelphia.

Cincinnati (Ohio) Shaper Co., The.

Cleveland Crane & Engineering Co., The Steelweld Mchry. Div., 1115 East 283rd St. Wickliffe. Ohio.

Cleveland (Ohio) Punch & Shear Works Co., The.

Dreis & Krump Mfg. Co., Chicago.

Farquhar, A. B., Co., Ltd., York, Pa.

Ferracute Machine Co., Bridgeton, New Jersey.

Hydraulic Press Mfg. Co., The, Mt. Gilead, Ohio.

Lake Erie Engineering Corp., 68 Kennurge.

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les

Hydraulic Press Mfg. Co., The, Mb. Gilead, Ohio.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Niagara Mch. & Tool Wks., Buffalo, N. Y.
PRESSES—Friction Screw
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Zeh & Hahnemann Co., Newark, N. J.
PRESSES—Hydraulic
Baldwin-Southwark Div. Baldwin Locomotive Wks., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Chambersburg (Pa.) Engineering Co.

Co.
Co.
Chambersburg (Pa.) Engineering Co.
Denison Engineering Co., 108 W. Chestnut
St., Columbus, Ohio.
Farquhar, A. B., Co., Ltd., York, Pa.
Fartel-Birmingham Co., Inc., Ansonia,
Conn.

Hannifin Mfg. Co., Chicago, Ill. Hydraulic Press Mfg. Co., The, Mb. Gilead, Ohio.

Hydraulic Press Mfg. Co., The, Mb. Gilead, Ohlo.

Lake Eric Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.

Mesta Mch. Co., Pittsburgh.

Morgan Engineering Co., The, Alliance, O.

Oligear Co., The, 1311 W. Bruce St.,

Milwaukee.

Watson-Stillman Co., The, 103 Aldene Road, Roselle, N. J.

Wood, R. D., & Co., Philadelphia, Pa.

PRESSES—Metal Extrusion

Watson-Stillman Co., The, 103 Aldene Road, Roselle, N. J.

PRESSES—Munition

Hydraulic Press Mfg. Co., The, Mt. Gilead, Ohlo.

PRESSES—Plastics Molding Hydraulic Press Mfg. Co., The, Mb. Gilea Ohio. Watson-Stillman Co., The, 103 Alden Road, Roselle, N. J.

Road, Roselle, N, J.

PRESSES—Power
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Cincinnati (Ohio) Shaper Co., The.
Cleveland Crane & Engineering Co., The
Steelweld Mchry. Div., 1115 East 233rd
Sh. Wickliffe, Ohio.
Cleveland (Ohio) Punch & Shear Works
Co., The.

Farrel-Birmingham Co., Moc., Ansonia
Conn.

Conn. Federal Press Co., Elkhart, Ind. Ferracute Machine Co., Bridgeton, New

stracute Machine Co., Jersey, yman, Joseph. & Sons, Phila. & J Press Corp., Elkhart, Ind. ew Albany (Ind.) Mch. Mfg. Co. iagara Machine & Tool Wks. Buffalo, N. Y. chatz Mfg. Co., The. Poughkeepsie, N. Y. homas Mch. Mfg. Co., Pittsburgh, N. Y. vaterbury (Ct.) Farrel Fdry. & Men. Co. The. Co., The. Zeh & Hahnemann Co., Newark, N. J.

Zeh & Hahnemann Cu., Additional PRESSES—Stamping Cleveland (Ohio) Punch & Shear Works Cu., The. Farquhar. A. B., Co., Ltd., York, Pa. Federal Press Co., Elkhart, Ind. Hydraulic Press Mfg. Co., The, Mt. Gilead, Ohio.

Ohio, & J Press Corp., Elkhart, Ind.

PRESSES-Straightening
Farquhar. A. B., Co., Ltd., York, Pa.
Hydraulic Press Mrg. Co., The, Mt. Gilead,
Ohio.
Olikear Co., The, 1311 W. Bruce St.,
Milwaukee, Wis.

Milwaukee, Wis.
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Niagara Mch. & Tool Wks., Buffalo, N. Y.

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St., Milwaukee, Wis.

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St., Milwaukee.

St., Milwaukee.

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Dodge Mfg. Corp., Mishawaka, Ind.

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Falls, Ohio.

PULLEYS—V-Belt

Mis-Chalmers Mfg. Co., Milwaukee, Wis.

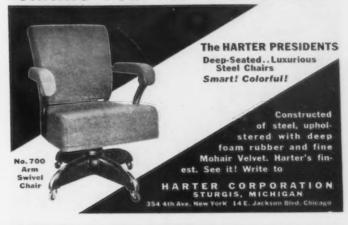
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PULVERIZED COAL SYSTEMS
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PULVERIZERS
American Pulverizer Co., 1439 Macklind
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Babcock & Wilcox Co., The, 85 Liberty St.,
New York City.
Whiting Corp., Harvey, III.
PUMPS—Boiler Feed
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Ingersoil-Rand Co. (Cameron), 11 BroadWay, N. Y.
UMPS—Centriugal

Allis-Chalmers Mfg. Co., Milwaukee, Wis. Ingersoil-Rand Co. (Cameron), 11 Broadway, N. Y. C. PUMPS—Centrifugal
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Allis-Chalmers Mfg. Co., Milwaukee, Wis. Roper, Geo. D., Corp., Rockford, Ill. Ruthman Machinery Co., Cincinnati, Ohio, PUMPS—Descaling
Allis-Chalmers Mfg. Co., Milwaukee, Wis. PUMPS—Electric Fairbanks, Morse & Co., Chicago, Roper, Geo. D., Corp., Rockford, Ill. PUMPS—Hydraulic Baldwin-Southwark Div. Baldwin Locomotive Wss., Philadelphia.
Fairbanks, Morse & Co., Chicago, Roper, Geo. D., Corp., Rockford, Ill. Watson-Stillman Co., The, 103 Aldene Road, Roselle, N. J.
PUMPS—Hydraulic—Radial—Variable Reversible Delivery
Hydraulic Press Mfg. Co., The, Mt. Gilead, Ohlo.
Olicear Co., The, 1311 W. Bruce St., Milwaukee, Wiskee, Wiskee

Hydraulic Press Mfg. Co., The, Mt. Gilead, Ohlo.
Oligear Co., The, 1311 W. Bruce St., Milwaukee. Wis.
PUMPS—Power Fairbanks, Morse & Co., Chicago.
Roper, Geo. D., Corp., Rockford, Ill.
PUMPS—Power Transmission
American Engineering Co., Philadelphia.
Oligear Co., The, 1311 W. Bruce St., Milwaukee.
Roper, Geo. D., Corp., Rockford, Ill.
Sundstrand Machine Tool Co., Rockford, Ill.

III.
PUMPS—Rotary Positive.
Crane Co., Chicago.
Roots-Connersville Blower Corp., Connersville, Ind.
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Iron & Steel Products, Inc., Chicago.

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RODS—Drill
Ridd Drawn Steel Co., Aliquipps, Pa.

RODS—Magnesium Alloys
American Magnesium Corp., 1701 Grif
Bildg., Pittaburgh.

Dow Chemical Co., The, 921 Jefferson Ave.

Midland, Mich.

RODS-Nickel Silver American Brass Co., The, Waterbury, Conn.

RODS—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila-Phosphor Bronze Smelting Co., The, Philadelphia, Pa.
Revere Copper & Brass, Inc., 230 Park
Ave., New York City.

RODS-Rustless Rustless Iron & Steel Corp., Baltimore, Md. RODS—Threaded Eastern Machine Screw Corp., The, New Haven, Conn.

Haven, Conn.

RODS—Wedding
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Ave., Milwaukee.
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Revere Copper & Brass, Inc., 230 Park
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RODS-Welding, Hard Surfacing Wall-Colmonoy Corp., Detroit, Mich.

Wall-Colmonoy Corp., Detroit, Mich.

RODS—Wire

American Steel & Wire Co. (U. S. Steel
Corp. Subsidiary), Cleveland,
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Mesta Mch. Co., Pittsburgh.

Morgan Construction Co., Worcester, Mass.

Morgan Engineering Co., The. Alliance, O.

National Roll & Fdry. Co., Avonmore, Ps.

Torrington (Conn.) Mfg. Co., The.

United Engineering & Fdry. Co., Ptgh.

Waterbury (Ct.) Farrel Fdry. & Mch. Co.,

The.

The.

ROLLS—Alloy Steel

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Pittsburgh.

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Berisch & Co., Cambridge City, Ind.

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ROLLS—Rubber Covered
Hewitt Rubber Covered
Hewitt Rubber Covered
Manhattan, Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Towsend
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Actna-Standard Engineering Co.. The. Youngstown, Obio. Birdsbore (Pa.) Steel Foundry & Machine Co. Continental Roll & Steel Foundry Co., East Chicago. Ind. Farrel-Birmingham Co., Inc., Ansonia, Conn.

Farrel-Birmingham Co., Inc., Ansonia, Conn.

Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh.

Mackintosh-Hemphill Co., Pittsburgh
Mesta Mch. Co., Pittsburgh.

Masta Mch. Co., Pittsburgh.

National Roll & Fdry. Co., Avonmore, Pa.

Ohio Steel Foundry Co., Lima, Ohio.

Pittsburgh. Rolls Div. of Blaw-Knox Co.,

Pittsburgh. Pittsburgh.

Thited Engineering & Fdry. Co., Ptgb.

ROLLS—Special Hardened

Rothlehem (Pa.) Steel Company.

Midvale Co., The Nicetown, Phila., Ps.

ROOFING MATERIALS

Carev. Philip. Co., The. Cincinnati. Ohio.

ROOFING-Coal Tar Pitch
Koppers Co., Tar & Chemical Div., Pittsburgh, Pa.

ROOFING—Special Copper Bearing Steel Superior Sheet Steel Co., The, Canton,

ROOFING-Steel Deck Mahon, R. C., Co., Detroit, Mich. ROOFING AND SIDING-Corrugated and

Plain
American Rolling Mill Co., The, Middletown, O.
Carey, Philip, Co., The, Cincinnati, Ohio.
Carnegie-Illinois Steel Corp. (U. S. Steel
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Corp. Subsidiary, Fitzsurgs Corp.
Cago.
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Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The,
Div. of The Andrews Steel Co.

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Phosphor Bronze Smelting Co., The, Philadelphia. Pa.

ROTARY MILLING MACHINES
National Broach & Machine Co., Detroit,
Mich.

ROTARY SHAVING MACHINES National Broach & Machine Co., Detroit,

Mich.

RUBBER MOLDED PARTS

Manhattan Rubber Mig. Div. of Raybestos-Manhattan, Inc., The, 2 Towsend bestos-Manhattan, Inc., The, 2 Towsend St., Passale, N. J. RUST PREVENTIVES American Chemical Paint Co., Ambler, Pa. Cowles Detergent Co., The, Cleveland, Ohio.

Houghton, E. F., & Co., Philadelphia, Pa. Parker Rust Proof Co., 2186 Milwaukee

Ave., Detroit.
RUST PROOFING COMPOUNDS
Parker Rust Proof Co., 2186 Milwaukee RUST PROOFING COMPOUNDS
Parker Rust Proof Co., 2186 Milwaukee
Ave., Detroit.
RUST PROOFING MACHINES
Mahon, R. C., Co., Detroit, Mich.,
RUST PROOFING PROCESS
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Enterprise Galvanizing Co., Philadelphia.
Parker Rust Proof Co., 2186 Milwaukee
Ave., Detroit.
Southern Galvanizing Co., Baltimore, Md.
SALT TABLETS
Morton Salt Co. Chicago, III

Morton Salt Co., Chicago, Ill.

SAND BLAST EQUIPMENT &
MACHINES

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Co..

Co.,

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Ray-send

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Co.,

MACHINES

American Foundry Equipment Co., The, 510 S. Byrkit St., Mishawaka, Ind.
Hydro-Blast Corp., The, Chicago, III.
Pangborn Corporation, Hagerstown, Md.
SAND BLAST STEEL SHOT

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Harrison Abrasive Corp., Manchester, N. H.

N. H.
Pangborn Corporation, Hagerstown, Md.
Pittsburgh (Pa.) Crushed Steel Co.
Steel Shot & Grit Co., Boston, Mass.
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SAND DRYERS
Hydro-Blast Corp., The Chicago, III.

SAND DRYERS
Hydro-Blast Corp., The, Chicago, III.
SAND HANDLING EQUIPMENT
Jeffrey Mgc, Co., The, Columbus, Ohio,
Link-Belt Co., 300 West Pershing Road,

Chicago, Ill.

SAND RECOVERY EQUIPMENT
SAND RECOVERY EQUIPMENT
The, Chicago, Ill.

Continental Machines, Inc., 1311 S. Washington Ave., Minneapolis, Min.

SAWS—Created Machines, Inc., 1311 S. Washington Ave., Minneapolis, Ind.

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Saws—Created Machines, Inc., 1311 S. Washington Ave., Minneapolis, Minn.

Saws—Circular, Rip & Cutoff Minneapolis, Ind.

Saws—Frietion Mineapolis, Ind.

Saws—Frietion Mineapolis, Ind.

Saws—Hask Saw Blades

Armstrong-Blum Mir. Co., 406 So. Illinois

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Saws—Hask Saw Blades

Armstrong-Blum Mir. Co., Chicago.

Atkins, E. C., & Co., 406 So. Illinois

St., Indianapolis, Ind.

Saws—Hask Saw Blades

Armstrong-Blum Mir. Co., Chicago.

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Saws—Hask Saw Blades

Armstrong-Blum Mir. Co., Chicago.

Atkins, E. C., & Co., 406 So. Illinois

St., Indianapolis, Ind.

Saws—Hot Metal

Alax Mir., Indianapolis, Ind.

Saws—Hot Metal

Alax Mir., Indianapolis, Ind.

Saws—Hot Metal

Alax Mir., Indianapolis, Ind.

Saws—Hot Metal

Saws—Hot Metal

Saws—Lore to Tooth. Cald

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St., Indianapolis, Ind.

Saws—Hot Metal

Saws—Hot Metal

Saws—Lore to Tooth. Cald

Atkins, E. C., & Co., 406 So. Illinois

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Saws—Hot Metal

Saws—Hot Metal

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St., Indianapolis, Ind.

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Saws—Hot Metal

Saws—Hot Metal

Saws—Hot Metal

Saws—Hot Metal

Saws—

SAWS-Pertable Electric
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Md.
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Peerless Machine Co., 1613 Junction Ave.,
Racine, Wis.

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Barrington & King Perforating
Harrington & King Perforating
Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount
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Ludlow-Saylor Wire Co., St. Louis, Mo.
Wickwire Brothers, Cortland, N. Y.
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RITS—Recessed Head

Wickwire Spencer Steel Co., 500 Fifth Ave. N. Y. C. SCREW DIVER BITS—Recessed Head Type

Machine & Tool Co., The, Dayton, Ohio.
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North Bros. Mfg. Co., Philadelphia, Pa.
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North Bros. Mfg. Co., Philadelphia, Pa.
SCREW DRIVERS—Recessed Head Type

SCREW DRIVERS—Recessed Head Type
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Continental-Diamond Fibre Co., Newark,
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Pa.
SCREW MACHINERY—Automatic
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Conn.

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SCREWS—Hardened Metalile Drive Parker-Kalom Corp., 200 Varick St., New York City.
SCREWS—Locking Screws—Locking Schemen Locking Schemen Locking Schemen Locking Co., 2525 N. Keeler Ave., Chicago.





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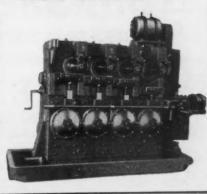
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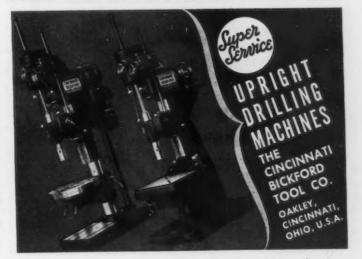
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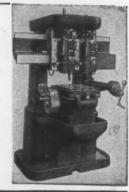




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Corp. Subsidiary), Pittsburgh & Chicago,
Columbia Steel Co. (U. S. Steel Corp.
Subsidiary), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
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Jones & Laughlin Steel Corp., Pittsburgh.
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Ohio.

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SHEETS—Hot Rolled Pickled
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(Fa.) Rolling Mill Co. The

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Newport (Ky.) Rolling Mill Co., The,
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42nd St., N. Y. C.

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Pa.
SLINGS—Wire Rope
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Roebling's, John A., Sons Co., Trenton,

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Diamond Iron Works, Inc., Minneapolis,

Minu.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Hartford (Conn.) Special Machinery Co.,

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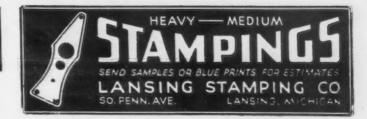
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Bidg., Pittsburgh.
Dow Chemical Co., The, 921 Jefferson Ave.,
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Lartobe (Pa.) Electric Steel Co.
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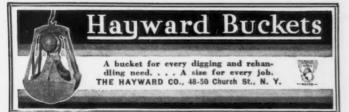
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Thompson-Bremer & Co., 1640 W. Hubbard St., Chicago.

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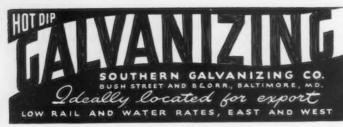


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St., New York City.
Laclede Steel Co., St. Louis, Mo.
Johnson Steel & Wire Co., Inc., Worcester,

Johnson Steet & Wire Co.,
Mass.
Page Steel & Wire Div. American Chain
& Cable Co., Inc., Monessen, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria,

Ohio.

Wickwire Bros., Cortland, N. Y.

Wickwire Spencer Steel Co., 500 Fifth
Ave., N. Y. C.

WIRE—Insulated
American Steel & Wire Co. (U. S. Steel
Corp. Subsidiary), Cleveland.
General Electric Co., Schenectady, N. Y.

Johnson Steel & Wire Co., Inc., Worcester,
Mass.

Mass.
Roebling's, John A., Sons Co., Trenton, N. J.
WirkE—Mattress
Roebling's, John A., Sons Co., Trenton, N. J.
WirkE—Netting
Ludlow-Saylor Wire Co., St. Louis, Mo.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Brothers, Cortland, N. Y.
WirkE—Piano and Musie
Johnson Steel & Wire Co., Inc., Worcester,
Mass.

WHE—Piano and music
Johnson Steel & Wire Co., Inc., Worcester,
Mass.
Webb Wire Works, New Brunswick, N. J.
Wickwire Spencer Steel Co., 500 Fifth
Ave., N. Y. C.
WHE—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.
WHE—Special Drawn Shapes
Rathbone, A. B. & J., Palmer, Mass.
WHE—Spring
American Steel & Wire Co., UI. S. Steel
Corp. Subsidiary), Cleveland.
Barnes, Wallace Co., Div. of Associated
Spring Corp., Bristol, Conn.
Columbia Steel Co., UI. S. Steel Corp.
Subsidiary), San Francisco, Calif.
Johnson Steel & Wire Co., Inc., Worcester,
Mass.

Subsidiary, Steel & Wire Co., Inc., Worcess, Johnson Steel & Wire Co., Inc., Worcess, Mass. Jones & Laughlin Steel Corp., Pittsburgh. Pittsburgh (Pa.) Steel Co., Trenton, N. J. Roebling, John A., Sons Co., Trenton, N. J. Seneca Wire & Mfg. Co., The, Fostoria, 2016.

WIRE—Spring (Music)
Johnson Steel & Wire Co., Inc., Worcester, hnson Steel & Wife Co.,
Mass.
ebb Wire Works, New Brunswick, N. J.
IRE—Stainless Steel
llegheny Ludlum Steel Corp., Pittsburgh,

Allegheny Ludium Steet Corp., Prikoutson, Pa.
Page Steel & Wire Div. American Chain & Cable Co., Inc., Monessen, Pa.
Rustless Iron & Steel Corp., Baltimore, Md. Webb Wire Works, New Brunswick, N. J. Wire Steel
Bethlehem (Pa.) Steel Company,
Johnson Steel & Wire Co., Inc., Worcester,
Mass.
Wickwire Brothers, Cortland, N. Y.
WIRE—Welding
Air Reduction, 60 East 42nd St., N. Y. C.

American Manganese Steel Div. of The American Brake Shoe & Foundry Co., Chicago Heighis, Ill.

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Cleveland.

Lincoin Electric Co., The, Cleveland.

Lincoin Electric Co., The, Cleveland.

Page Steel & Wire Div. American Chain & Cable Co., Inc., Monessen, Pa.

Pittsburgh (Pa.) Steel Co.

Revere Copper & Brass, Inc., 230 Park Ave., New York City.

Roebling's, John A., Sons Co., Trenton, N. J.

Seneca Wire & Mfg. Co., The, Fostoria, Ohio.

Una Welding, Inc., Cleveland. Ohio.

Wickwire Brothers, Cortland, N. Y.

Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.

WIRE—Zinc

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Ccnn.
WIRE CLOTH
Buffalo (N. Y.) Wire Wks. Co., Inc.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth
Ave., N. Y. C.
WIRE DRAWING MACHINERY—See
Wire Mill Mehry. & Equip.
WIRE DRAWING, STRAIGHTENING &
CUTTING MACHINERY
Ajax Mig. Co., The, Cleveland.
WIRE EDRAWING.

CUTTING MACHINE COUNTY AND THE COUNTY OF THE

EQUIPMENT
Morgan Construction Co., Worcester, Mass.
Shuster, F. B., Co., The, New Haven,
Conn.
Waterbury (Ct.) Farrel Fdry. & Mach.

Waterstand Co., The Co., The WIRE PRODUCTS
WIRE PRODUCTS
Mariean Spring & Mfg. Corp., Holly.

WIRE PRODUCTS

American Spring & Mfg. Corp., Holly.

Mich.

American Steel & Wire Co. (U. S. Steel
Corp. Subsidiary), Cleveland.

Barnes-Gibson-Raymond, Detroit Plant
Div. of Associated Spring Corp.

Barnes, Wallace, Co., Div. of Associated
Spring Corp., Bristol, Conn.

Buffalo (N. Y.) Wire Wks. Co., Inc.

Dunbar Bros. Co. Div. of Associated Spring
Corp., Bristol, Conn.

Eastern Tool & Mfg. Co., Bloomfield. N. J.

Hindley Mfg. Co., Valley Falls. R. I.

Hubbard, M. D., Spring Co., 329 Central
Ave., Pontlac, Mich.
Jones & Laughlin Steel Corp., Pittsburgh.

Pittsburgh (Pa.) Steel Co.

Raymond Mfg. Co. Div. of Associated
Spring Corp., Corry, Pa.

U. S. Steel Wire Spring Co., Cleveland, O.

Wickwire Bros., Cortland, N. Y.

Wickwire Spencer Steel Co., 500 Fifth
Ave., N. Y. C.

WIRE PRODUCTS—Formed Wire

Ave., N. Y. C.

WIRE PRODUCTS—Formed Wire

Accurate Spring Mfg. Co., 3819 W. Lake
St., Chicago, Ill.

American Spring & Mfg. Corp., Holly,

Mich.

American Spring & Mfg. Corp., Holly.
Mich.,
Barnes-Gibson-Raymond. Detroit Plant
Div. of Associated Spring Corp.
Barnes. Wallace. Co., Div. of Associated
Spring Corp., Bristol, Conn.
Cuyahoga Spring Co., The. Cleveland.
Dunbar Bros. Co. Div. of Associated
Spring Corp., Bristol, Conn.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Beschke Wire & Specialty Co., 315 Industrial Ave., Crawfordsville, Ind.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Raymond Mfg. Co. Div. of Associated
Spring Corp., Corry, Pa.
Roebling's, John A., Sons Co., Trenton,
N. J.

N. J.
WIRE ROPE
WIRE ROPE
American Steel & Wire Co. (U. S. Steel
Corp. Subsidiary), Cleveland.
Bethlehem (Pa.) Steel Company,
Columbia Steel Co. (U. S. Steel
Corp.
Subsidiary), San Francisco, Calif.
Jones & Laughlin Steel Corp., Pittsburgh,
Leschen, A., & Sons Rope Co., St. Louis,
Mo.

Jones & Laugner.
Leschen, A., & Sons Rope Co., St. Mon.
Mo., Macwhyte Co., Kenosha, Wisc.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Spencer Steel Co., 500 Fifth
Ave., N. Y. C.
WIRE ROPE FITTINGS
American Hoist & Derrick Co., St. Paul.
Minn.
Macwhyte Co., Kenosha, Wisc.
Roebling's, John A., Sons Co., Trenton, N. J.
WIRE STRAIGHTENING AND CUTTING MACHINERY—Automatic
Shuster, F. B., Co., The, New Haven, Ct.
WORK EJECTORS—Air Operated
Logansport (Ind.) Machine, Inc.
WRENCHES

Josansport (Ind.) Machine, Inc.
WHENCHES
Armstrong Bros. Tool Co., Chicago.
Williams. J. H., & Co., Buffalo, N. Y.
WHENCHES—Pipe
Greenfield (Mass.) Tap & Die Corp.
Ushco Mfg. Co., Inc., 135 Tonawanda St.,
Buffalo, N. Y.
WHENCHES—Pneumatic
Ingersoll-Rand Co., 11 Broadway, New
York City.

York City.
WRENCHES—Tap
North Bros. Mfg. Co., Philadelphia, Pa. Platt Bros. & Co., The, Waterbury, Conn. ZIRCONIUM METAL & ALLOYS
Electro Metallurgical Sales Corp. 30 E. 42nd St., N. Y. C.

#### CONSIDER FIRST GOOD USED EQUIPMENT

IMMEDIATE AVAILABILITY AND DELIVERY ARE IMPORTANT FACTORS PARTIAL LIST — NUMEROUS OTHER MACHINES ALSO AVAILABLE



70 TON NORTHERN 81' 4" SPAN WITH 2—35 TON TROLLEYS
220/440 VOLT, 3 PHASE, 60 CYCLE, A.C. MOTORS
CUTLER HAMMER CONTROL EQUIPMENT

#### CRANES? YES, WE HAVE THEM FOR IMMEDIATE DELIVERY

5 TON to 70 TON — 25' to 100' SPAN SINGLE AND DOUBLE HOIST

2 ton Shaw 2 ton Shaw 2 ton Shaw 2 ton Shaw	40'6" 41'5%" 42'4%" 43'7%"		550/3/60	A.C.
3 ton P & H		Span	550/3/60	
3 ton P & H	16'9" 29'6"	Span		
ton Whiting	91'	Span		
6 ton Bedford	37"7"	Span		
		Span	220/3/60	
71/2 ton Northern	46'9"	Span	230 Volt	D.C.

#### AIR COMPRESSORS

TOMPRESSORS

754 cu. ft. 22"x13"x16" Worthington, Two Stage
Belt Driven. 100 lbs. Pressure
190 cu. ft. 15/30x27/16½x24 Worthington Engine
Driven. 39 lbs. Pressure
0c. ft. 21/40x22½/36x30 Ingersoll-Rand Class
0RC-3 Steam Driven. 100 lbs. Pressure

#### BENDING ROLLS

Bertsch Initial Type, M.D. Capacity 14" 10° Bertsch Initial Type, M.D. Capacity 1¼" Plata 12' Niles-Bement-Pond, Pyramid Type, M.D. Capacity 1" Plate

### 20' COVINGTON INITIAL TYPE BENDING ROLL

OLL
Bending Rolls 24" Diameter
Rising Roll 18" Diameter
Drop End Housing Motor Driven
Steel Housings
Forged Steel Rolls

#### BORING MILLS-HORIZONTAL

bar Barrett Cylinder Boring Mche. Work table 36"x10'6"
bar Barrett Cylinder Boring Mche. Work table

54"x10'
" bar Niles-Corlies Cylinder Boring Mche. Arr. for M.D. Will mill or bore at a height of 60" over table and 10' long

#### BULLDOZERS

\$7 Ajax. Motor Driven, 16" stroke, 12"x76" Face of Crosshead 27 Williams & White, Motor Driven, 22" stroke, Face of Crosshead 16"x70" 29 Williams & White. Arr. M.D. 24" stroke. 108"x20" Face of Crosshead

#### BRAKE-LEAF TYPE

\$167 Chicago, arranged for direct motor drive. Capacity 6'x%"

BRAKES-PRESS TYPE 12' Ohl, B.M.D. Capacity %" Plate 8'6" Loy & Nawrath, M.D. Capacity 210 Gauge

72" Pond Radial Drill Press, Horizontal Range of Head 4'7", Vertical range of Arm 6'6". Motor Driven FORGING MACHINES
%" to 7" Ajax, National, Acme, Steel Frame

#### FURNACE

DRILL

3 ton Pittsburgh Electric Steel Melting Furnace. Complete with Transformers

#### GEAR REDUCTION UNITS

500 H.P. Falk Gear Reduction with 500 H.P. 2200/3/60 synchronous motor 1500 H.P. Mosta Gear Reduction 9.75 to 1 Gear Ratto, complete with 1500 H.P. General Elec-tric Motor, 1600 Volt, 3 Phase, 60 Cycle, 300 R.P.M.

GENERATORS 500 KW General Electric Generator 2300 volt, 3 phase, 60 cycle with 665 H.P. McIntosh-Seymour Diesel Engine 1250 KVA Generator, 2300 volt, 3 phase, 60 cycle with 1000 KW General Electric Turbine 4000 KW General Electric Generator with direct connected General Electric Steam Turbine

# 10 ton P & H 26' Span 220 Volt D.C. 3 ton Auxiliary Hoist 10 ton P & H 32'3'4" Span 220 Volt D.C. 10 ton P & H 32'3'4" Span 220 Volt D.C. 10 ton Cleveland 43'7" Span 220 Volt D.C. 5 ton Auxiliary Hoist 15 ton Shaw 46' Span 230 Volt D.C. 20 ton P & H 32'7'4" Span 230 Volt D.C. Span 220 Volt D.C.

# HAMMERS — BOARD DROP — STEAM DROP — STEAM FORGING 800—8000 lb. Chambersburg, Billings & Spencer. Erie, Niles-Bement-Pond

#### LEVELLER

75" Torrington Roller Leveller, 19 rolls 2" dia., Cap. ,060 ga. Arr. M.D.

#### MILLING MACHINE

Becker Vertical Milling Machine, table size 20"x72". 8 spindle speeds and 32 table feeds. Motor Driven

#### MILLING MACHINE-PLANER TYPE

Ingersoll Planer type Milling Machine, 2 rail heads. One head each housing 44" between housings. 24" height under rail; 18' length of table

4" Landis, Motor Driven, complete with cutting 0" attachment and chamfering attachment 8" Standard Engineering Company Pipe Threading and Cutting Machine, Arr. for M.D.

16" William Pipe Threading Mch., M.D.

42"x42"x12' Pond Three Head, T & L Pulley Drive 48"x48"x32' Putnam Three Head, T & L Pulley Prive x96"x16' Betts, Two Head. Belt Drive

PLANERS—OPEN SIDE
60"x48"x38' Liberty Three Head, Motor Driven
72"x72"x18' Detrick & Harvey, Three Head, M.D.

PRESSES-HYDRAULIC

500 ton United Engineering and Foundry Company. High Speed Hydraulic Forging Press, Four Column Type 760 ton Southwark Vertical Press, 20" Stroke. 41½" 13" Between Columns 1000 ton Southwark Forging Press, 3 Column, 17" dis. 7" Between Columns. 15" Stroke 30" Daylight

PRESSES—DOUBLE ACTING—TOGGLE

No. 168% Toledo Toggle Drawing Press, Bed area
48"x50". Stroke of Blankholder 18". Stroke of
Plunger 26"

No. 4 Bliss, Tie Rod Construction, 10" Stroke
of Blankholder, 14" Stroke of Slide, 34"x31½"

Area Top of Bed

#### -SINGLE ACTING-STRAIGHT SIDE

No. 52 Toledo, 3" Stroke, 29" Bet. Ups.
No. 58 Toledo, 6" Stroke, 27" Bet. Ups.
No. 166½ Consolidated, 6" Stroke, 47" Between
Uprights
No. 59 Toledo, 12" Stroke, 39" Bet. Uprights
No. 356 Toledo, rack and pinion press. stroke
around 5" to 36". Bed area 22"x22"

#### PUMP-HYDRAULIC

2%"x24" Worthington Horizontal Duplex.
M.D. Capacity 159 G.P.M. at 5700 lbs. Pres

No. 7 Hilles & Jones Automatic Gas Drum Con-trol. Cap. 40 13/16" holes thru %" Plate, Eq. Thomas Spacing Table No. 32 Williams & White with Thomas Spacing Table, M.D. Will handle 8' wide plate up to 30' long

20 ton P & H 50' 4 ton Auxiliary Hoist 20 ton Whiting 65' 25 ton Niles 30' 25 ton Northern 50' 25 ton Bedford 65' 30 ton Alliance 32'3¼" 10 ton Auxiliary Hoist 30 ton Whiting 75' Span 230 Volt D.C. Span 220/3/60 A.C.

#### PUNCHES & SHEARS COMBINATIONS

No. 6 Beatty Double End, M.D. 16" Throat. Capacity Punch 1" Through 1"
Type G Cleveland Single End, Belted Motor Drive.
72" throat. Capacity Punch 2" through 1"
Type G Cleveland Single End. Arr. for M.D.
12" Throat. Capacity Punch 2" through 1"

#### ROLL-CORRUGATING CURVING

10' Bertsch Initial Type, Belt Drive, Capacity 3/16", 2.66 Corrugations

#### ROLL FORMING MACHINE

No. 25L6 Kane & Roach Cold Roll Forming Ma-chine. Arr. for M.D. Equipped with rolls to form channels 1" to 6" wide with maximum leg depth of 11%" of No. 12 gauge

#### ROLLING MILLS

OLLING MILLS

10"x16" UE&F Co. Single Stand Two High

12"x15" Mackintosh Single Stand Two High

12"x20" Philadelphia Single Stand Two High

12"x36" Lewis Single Stand Two High

12"x36" Lewis Single Stand Two High

16"x19" Waterbury Farrel Four Stand Two High

16"x20" Waterbury Farrel Single Stand Two High

16" Stands, 2 High

2 Stands, 2 High

18" Garrison Bar Mill, 2 Stands, 3 High

18 Stand 2 High

24" Mackintosh Bar Mill, 2 Stands 3 High

15%"x16" Actna Std. Engr. Co. Tube Mill Single

Stand Two High

23" Cold Roll Tin Plate Sheet Mill

24" Cold Roll Tin Plate Sheet Mill

30" Morgan Billet Mill Three High

#### SHEARS-BAR

Mesta Guillotine Bar Shear, Arr. M.D. Capacity 6" Square Mild Steel No. 6 Hilles & Jones Guillotine Type, M.D. 8" Stroke, Capacity 4"x4"

Mests Vertical Open Throat Sheet Bar Shear M.D. Capacity four 14"x8" Cold Bars. Complete with

No. 8 Beatty Vertical Open Throat Sheet Bar Shear, M.D. Capacity 4"x30" Cold Bars SHEARS-ROTARY

No. 40A Quickwork Rotary Shear, Arr. for Motor drive. Capacity 1/2" Plate. Complete with Circle Cutting Attachment

#### SHEAR-ROTARY FLYING

United Engineering & Foundry Co., motor driven, 1" rounds up to 2"x%" flats

#### SHEARS—SQUARING

Wais & Roos. Arr. for M.D., Capacity %" SLITTERS

48" Putnam, motor driven, capacity 30 cuts No. 28 gauge and up to 3 cuts No. 7 gauge 60" Bliss #213-E, arranged for V-beit drive. capacity 7 cuts, No. 14 gauge

#### STRAIGHTENERS

%" Hallden No. 2 Straightening & Cut-off Ma-chine. Arr. for M.D. 12' Cut-off United Engineering & Fdry. Co. Straighteners of Gas Press M.D. Capacity 14" to 5" tubing

Manufacturing

RITTERBUSH & (OMPANY, INC NEW YORK CITY

Equipment

Confidential Certified Appraisals Liquidations-Bona Fide Auction Sales Arranged

Consulting Engineering Service-Surplus Mfg. Equipment Inventories Purchased:

THE IRON AGE, March 27, 1941-179

# The Clearing House



# We'll Transmute Your Dross into Gold

An alchemist, as you learned in grade school, is a man who spent his life trying to find a formula for transmuting a common material into gold. A He was doomed to failure. But we are modern alchemists and we have discovered the formula. It is simple. This is it: In practically every plant there is some surplus equipment. Idle equipment is dross. But transfer it to a plant where it is needed and it becomes gold. Perhaps you are badly in need of machine tools to use in executing defense orders. Perhaps you have some idle equipment that other manufacturers need. Let us know what you have to offer or what you need. Write, wire or telephone—

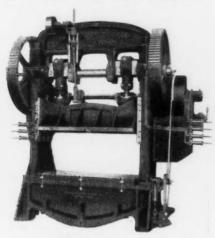
# LOUIS E. EMERMAN & CO.

1761 Elston Ave., Chicago, Ill.

# The Clearing House

# PRESSES for Immediate Delivery

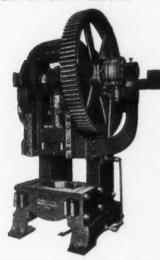
DOUBLE CRANK PRESSES



- 1—245 D S-54" Cleveland 1½" stroke
  1—23 Bliss 32" between uprights
  1—245 D S-54" Cleveland 1½" stroke
  1—8 G-84 Ferracute 2" stroke
  1—24 Walsh 18"x46" bolster 2¼" stroke
  1—292-L Toledo, 48"x96" bed, 6" stroke
  1—294½-G Toledo, 38"x84" bed, 8" stroke
  2—290-F Toledo, inclinable, 3" stroke
  1—291-C Toledo
  1—250—5½—84 Mineter 84" bedyeen 1-291-C Toledo 1-250-5½-84 Minster, 84" between uprights 1-293-C Toledo, inclinable 1-25½-Bliss 1-294½-C Toledo 1-205-H Toledo

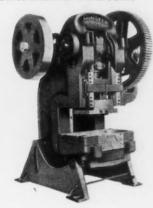
- 1-\$105 Consolidated, inclinable 1-\$50-8-54 Minster, 45x85 bed, 8" stroke 1-\$5A Bliss 3" stroke 1-\$94-E Toledo

#### **OPEN BACK PRESSES**



- 2—\$75 Bliss sap 1 ¼" stroke
  1—\$73 Bliss gap 3" stroke
  1—\$73 ½ Bliss 1" stroke
  1—\$74 Toledo 2" stroke
  1—\$78 Toledo 16" stroke
  1—\$78 Toledo inclined 16" stroke
  1—\$75 Toledo 2½" stroke
  2—\$75 Toledo 2" stroke
  1—\$75 Toledo 6" stroke
  2—\$75 Toledo 3" stroke
  1—\$77 Toledo ap 3" stroke
  1—\$77 Toledo ap 3" stroke
  1—\$77 Toledo
  1—\$78 Toledo
  1—\$78 Toledo

#### OPEN BACK INCLINABLE PRESSES



- 1-53A Willard 1 7/16" stroke 1-51 Bliss 1¾" C S., 1½" stroke 1-58-S Verson 7" C. S., 4" stroke 1-58-S Verson 7" C. S., 6" stroke 1-54 Toledo 1¾" C. S., 6" stroke 1-54 Toledo 1¾" C. S., 1½" stroke

#### HORNING **PRESSES**

- 2-281 H Consolidated (bench) 114" stroke 1-243-B Toledo, rivet-ing 114" stroke 1-210-4 Minster 2-214 Toledo 1-210-4 Minster



#### FORCING PRESSES. BENDING&STRAIGHTENING

- BENDING&STRAIGHTENING

  1—General Flexible, 4 post, 8 ton

  2—30 ton Lucas, horizontal, 36" stroke

  3—20 ton General Flexible, 4 post

  5—212 Fox Super Flex, "C" frame, 6 ton

  2—230 General Flexible, 3 ton, 3 post

  5—224 Fox, 12 ton, "O" frame, 18" stroke

  1—500 ton Ball, horizontal, hyd.

  2—20 ton Fox

  2—60 ton Metalwood, hyd., 3 column

  1—20 ton Oilgear, horizontal, hyd.

  1—15 ton, vertical Lucas

  1—8 ton General

  1—Eastern, hyd., 7" stroke

  1—325 Metalwood, vertical, 8" stroke

  1—3 ton Fox

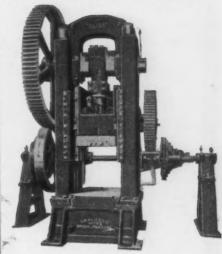
  1—30 ton Fox

  1—8 pringfield straightening

  1—Krueger vert.

  wheel facer

#### STRAIGHT SIDE PRESSES



- -278½ Bliss S. C., 16" stroke
  -263 Michigan S. C., 1" stroke
  -255 Toledo S. C., 4" stroke
  -203 Bliss 3" stroke
  -255 Toledo, 4" stroke
  -256½ Toledo, 4" stroke
  -256½ S Toledo
  -2510 Bliss 8" stroke
  -256 Toledo 12" stroke
  -2304 Bliss 6" stroke
  -2307-A Bliss (new) 14" stroke
  -2307-A Bliss 28" stroke
  -2307-A Bliss 28" stroke
  -2308-A Bliss 28" stroke
  -250 Toledo 10" stroke
  -255½ Toledo
  -259½ Toledo 8" stroke
  -260½-S Toledo 8" stroke
  -260½-S Toledo 10" stroke
  -Ferracute
  -259 Niagara

#### SOLID BACK PRESSES

- 1—233-P Toledo
  3—2P-2 Ferracute
  1-2PG-2 Ferracute
  1-2P Ferracute
  1-2P Ferracute
  1-2P Ferracute
  1-2PG-1 Ferracute
  314/2 stroke
  3-2P Ferracute
  2" stroke





#### FOOT PRESSES

- 1—2448 Stimpson 2—212 Excelsior (new) 3" stroke 1—218 Famco (new) 4½" stroke

#### DRAWING PRESSES

- 1— $\sharp 264$  Consolidated double action, cam 2— $\sharp DD\text{-}2$  Ferracute,  $1\frac{1}{2}''$  ram, 3'' plunger
- stroke 1-\$25 Toledo, open back, cam

LOUIS E. EMERMAN & CO.

1761 Elston Ave., Chicago, Ill.





#### Motor Drive Norton Grinders

	6"x32"		10"x50"		16"x 50"
	10"x18"		10"x72"		16"x 72"
ı	10"-15"	GAPx18"		GAPx72"	16"x120"
l	10"x24"		14"x36"		18"x 96"
ı		GAPx24"	14"x50"	18"-24"	GAP x 96"
l	10"x36"		14"x72"		21"x 96"
ı					24"x120"

Boring Machines
No. 72—456" Bar Niles-Bement-Pond, Duplex
Control, Motor Drive
No. 2—5" Bar Barrett, Extension Bed

No. 2—5" Bar Barrett, E Boring Mills 52" Gisholt 54" Colburn 60" Gisholt, Motor Drive 72" King, Motor Drive 72" Bickford 76" Bullard

76" Bullard

Drills

No. 2—I spdl. Foote-Burt Sipp
i, 2, 4 spdl. Henry & Wright
No. 2—4 & 6 spdl. Leland-Gifford
No. 2—6 colburn, 3 & 4 spdl.
4 spdl. Moline, Hole Hog
No. 4—5 Spdl. Foote-Burt Rail
No. 1, No. 3 Baush Multiple
7' American Univ. Radial
8' Western Plain Radial

Gear Cutters

No. 3—26" Brown & Sharpe
No. 4—48" Brown & Sharpe
No. 6—72" Brown & Sharpe
No. 8-A—72" Cincinnati
96" Newton, M.D.
No. 16-HS, No. 24-HS Gould & Eberhardt
18" Gleason Bevel Generator

Grinders

12" swing Norton Mfg. Universal
18" swing Norton Mfg. Universal
18" swing Norton Mfg. Universal
No. 2½ Universal (Bath Type)
10"x36" Thompson Universal
No. 4—12"x66" Landis Universal
16"x32" Landis Crankshaft
14"x96" Norton Face

Lathes
16"x8' Flather
17"x6' LeBlond
18"x8' Ledge & Shipley
20"x8' Rahn-Larmon
20"—40"x10' Rahn-Larmon Geared Head Sliding Bed Gap
24'x12' American
24'x13' Chard
24'x16' Lodge & Shipley
24'x18' American Geared Head
24'x20' L & S. Grd. Hd., Taper
24"x22' Lodge & Shipley, Taper Attachment
27"x18' American Geared
27"x18' American Geared
30'x12' Lodge & Shipley
36'x16' American, Taper
36'x24' Bradford Triple Geared, Taper Att.
40'x12' Fifield

Millers

Mendey Mfg.

40"x12' Fifield

Millers
No. 4 Hendey Mfg.
Type "B" Briggs Mfg.
No. 12 Pratt & Whitney Mfg.
No. 5 Brown & Sharpe Vertical
No. 5-B. No. 6 Becker Vertical
Type ACS Becker Vertical
24"x2"x12' Injersoil Adj. Rail
36"x36"x12' Newton Duplex
38"x44"x20' Injersoil Slab
72"x16"x14' Injersoil No. 1 Smalley-General Thread

No. I Smalley-teneral Initial
Planers
24"x24"x6' Cincinnati
24"x24"x6' Rockford
24"x24"x12' Gray
30"x30"x 8' American
30"x36"x16' Niles-Bement-Pond
42"x42"x14' Gray
48"x48"x10' Niles-Bement-Pond
60"x48"x20' Hamilton
72"x60"x16' American

Presses
No. 01 V. & D., M.D.
No. 1V. & O., M.D.
No. 1½ V. & O., M.D.
No. 20 Bilss, M.D.
No. 58 Toledo Nosing
No. 178 Toledo Toggie Drawing

No. 178 Toledo Toggle Drawing
Turret Lathes
18" Dreses Fox Monitor
No. 6—2'x" Wood, A.C. & B.F.
No. 6—2'x" W. & S., A.C. & B.F.
18" Libby
2'x'\*x24" Jones & Lamson
3"x38" Jones & Lamson
No. 3.4 Warner & Swasey, A.C. & B.F.
2!" Gisholt, 3½" H.S.
24" Gisholt, 3½" H.S.
26" Libby, 7½" H.S., Taper Att.

#### HILL - CLARKE MACHINERY COMPANY 647 Washington Blvd. Chicago

## GOOD TOOLS

AIR COMPRESSORS

AIR COMPRESSOR
67' Chicago Pneumatic, type NSB.
136' Chicago Pneumatic, type NSB.
136' Ingersoll Rand, type ER1.
265' Worthington.
355' Ingersoll Rand, type ER1.
357' Bury, class HL.
369' Chicago Pneumatic, class NSB.
550' National, 3-cylinder vertical.
620' Sullivan, class WJ3.
676' Ingersoll Rand, type XRE2.
706' Sullivan, class WJ3.
868' Chicago Pneumatic, type OCB.

#### RADIAL DRILLS

Cincinnati Bickford.

3' Cincinnati Bicktoro.
3' Dreses.
3' Dreses.
3'4' Western.
3'5' Morris.
4' Western.
4' Dreses.
5' Western.
5' American, full universal.
6' Niles Bement Pond, full universal.
No. 3 Barnes horizontal. Cone or SPD, no tapping.

#### GEAR MACHINERY

12"x13" No. 12HS Gould & Eberhardt Mfg.

12"x13" No. 12HS Gould & Eberhardt Mfg. hobber.

18"—30"x12" No. 18H Gould & Eberhardt universal hobber.

5"x7" No. 3 Barber Colman hobber.

12"x10" No. 12 Barber Colman hobbers.

8"-10" No. 11 Lees Bradner production hobber.

14"x8" No. 5A Lees Bradner generator.

14" No. 5 AC Gear hobber.

24" Gleason bevel planer.

26" No. 3 Brown & Sharpe auto spur.

28" Gould & Eberhardt automatic spur & bevel.

36"x6" Gould & Eberhardt spur gear cutter.

48"x10" No. 4 Brown & Sharpe automatic spur.

15" Gleason bevel gear quencher.

Gleason bevel gear testers.

Gleason circular finishing cutters, without blades.

Gleason circular anishing cutters, without blades.

No. 2 Bliton automatic gear miller.

National Tool Co. (Cleveland) Model B gear and gearshaper eutter checking machine.

No. 4M involute cutter and gear checker.

Lipe gear tooth chamfering machine. double spindle.

#### **ENGINE LATHES**

All have quick change gears unless otherwise All have quick change gears unless values and 14"x8' Walcott.

14"x8' Valcott.

14"x8' Lodge & Shipley, patent head.

16"x6' Porter McLeod, TA.

16"x6' Lodge & Shipley.

16"x6' Hendey, cone drive.

16"x6' Monarch, double back gears.

16"x6' Monarch, motor in base.

20"x10' American, standard change gear.

20"x10' Hendey.

21"x18' Leblond, heavy duty.

22"x10' Davis, double back geared.

22"x12' Morris, 12-speed geared head.

24"x10' Lodge & Shipley, geared head.

24"x10' Leblond, double back gears.

24"x10' Schumacher & Boye, double back gears.

T.A.

T.A. 24"-48"x10' Rahn Larmon extension bed gap

24"-48"x10" Hann Larmon extension bed gap lathe. 24"x12" Lodge & Shipley, patent head. 24"x16" Schumacher & Boye. 26"x15" American geared head. 30"x12" Lodge & Shipley, double back geared. 36"x22" Schumacher & Boye.

#### BORING MILLS

Cleveland horizontal.

21½" Cleveland norm 3" Binssee. 5" No. 2 Barrett. 36" Niles car wheel. 40" Bullard. 42" Bullard. 52" Gisholt. 60" Colburn.

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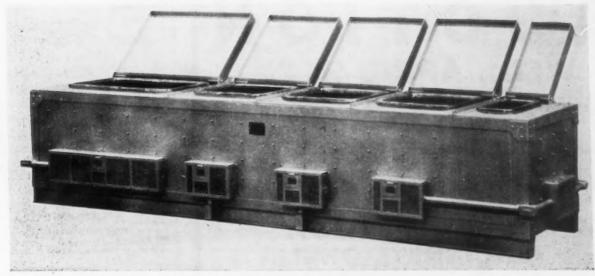
Norton crankpin grinder.
No. 6A Bryant grinder.
No. 4, 5 & 9 Foster turret lathes.
No. 13B Brown & Sharpe mfg. mill.
No. 1 Kempsmith plain miller.
A. B. Becker vertical miller.
No. 2% Rockford universal miller.
S0 ton Jarecki screw press.
Billings & Spencer type B die sinker.
30"x30"x10' Cincinnati planer.
24" American "Auto oil" shaper.

Please send us your inquiries, also lists of any surplus or available tools.

MILES MACHINERY CO. Saginaw, Mich.

# -The Clearing House

#### **DUTY 5-POT TINNING FURNACES** ORIGINAL OVER \$6000



#### AVAILABLE FOR IMMEDIATE DELIVERY **Dimensions of pots:**

#1—24" wide x 40" long x 24" deep #3—24" wide x 24" long x 24" deep #2—24" wide x 24" long x 24" deep #5-8" wide x 24" long x 4" deep

Overall dimensions—approx. 5' wide x 15' long x 3' high. Four zones of temperature control provided for all pots. Total rating of furnaces 120 K.W., 220 volt, 3 phase.

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## HIGH GRADE MACHINE TOOLS

**USED** and REBUILT

BORING MILLS-Horiz. & Vert. PLANERS LATHES TURRET LATHES GRINDERS-Univ., Plain, Internal, Rotary GEAR HOBBERS GEAR CUTTERS RADIAL DRILLS

and all other types of machine tools

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Planers, Milling Machines Drill Presses, Grinders Shapers, Lathes, Boring Mills

Monarch Machinery Co. 325 No. 3rd St., Phila., Pa. Menarch Machine Tools Are Sold on Approval

0.

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36"x36"x14' DETRICK & HARVEY Open Side Planer 36"x36"x12' CINCINNATI Planer 36"x36"x10' POND Planer 72" GOULD & EBERHARDT Gear

Cutter

No. 6 FELLOWS Gear Shaper 6" GLEASON Bevel Gear Generator 15" GLEASON Spiral Bevel Gear Generator

No. 12 BARBER-COLMAN Gear Hobber-quick return

NATCO Horizontal 3 way drillhydraulic feeds 24"x14' LODGE & SHIPLEY Engine

Lathe-cone driven 10"x36" NORTON External Grinder

> Hundreds of other machine tools in stock.

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One HEALD 55 internal cylinder grinder with 5 H.P. Wagner motor. Condition equal to new, has been in our shop unused for months at a time since we purchased it from Heald.

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1200g Billings & Spenser
2—1000g Biliss 3—800g Biliss
MILLING MACHINES, VERTICAL S.P.D.
Becker, 25C—24B—Model C—28
MILLING MACHINES, UNIVERSAL S.P.D.
24A B & S. 22 Kempsmith; 24 Becker;
22 Cincinnati; 22 Rockford; 22B Kearney
Trecker Dible, Overarm; 21/2 LeBlond
MILLING MACHINES, PLAIN
23B Kearney Trecker Dible, Overarm;

MILLING MACHINES, PLAIN

33B Kearney Treeker Dile. Overarm;
24B B & S Dile. Overarm, Motor in base;
24 Cincinnati Hi Power; 25 LeBlend;
22B Kearney Treeker; 22 & 23 Cincinnati
BORING MILLS, MORIZONTAL
3" Universal; 2300 Giddings & Lewis, 4½" bar
BORING MILLS, VERTICAL
Bullard Rapid Prod. Side Head, 24" & 36";
Bullard 50" & 72"; 50" Niles
42" Niles-Bement-Pond
PLANERS
10x10x30 Ft. Niles 2 switch background

PLANES:
IOXIOX30 Ft. Niles, 2 swivel heads and 2 slde heads, 122" between housings;
36"x36"x14 Ft. Detrick & Harvey, with slde head;
36"x36"x14 Ft. Detrick & Harvey Openside;
36"x36"x8 Ft. Niles; 20 Ft. Niles Plate Planer;
60"x60"x18 Ft. Pend; 26"x8 Ft. Clevaland Openside; 26"x8 Ft. Cincinnati, 30"x39"x10 Ft. American
PRESSES, DOUBLE CRANK
133" CLEARING CRANKLESS 4-POINT SUSPENSION TYPE TRIPLE ACTION PRESSEDION TYPE TRIPLE ACTION TYPE TRIPLE TRIP

No. 60101/4 Hamilton, single geared, bed 60"x51", friction clutch, 101/4" shaft diameter, the red frame:
No. 6-D Bliss, 12" stroke, 36"x60" bed, air cushion:

cushion; No. 153-C Bliss, 8" stroke, 34"x48" hed, 48" height die space, air cushion; No. 154-G Bliss, 12" stroke, 46"x84" bed, air

No. 154-B Bills, 14 survey, cushion; No. 94-G Toledo, 8" atroke, 42"x84" bed, air cushion; No. 93-C Toledo, 5" atroke, 34"x48" bed; No. 8 Bliss, 36"x50" bed, 8" shaft, cush.; No. 152-B Cleveland, 36" between uprights; No. 158-B Cleveland, 11" shaft, 72" between housings; No. 154-F Cleveland, tie rod, 5" stroke, 721/2" be-tween housings:

tween housings; No. 206-B Toledo, gap frame, 7" shaft, 48" be-tween housings, 6" streke.

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AT ABSOLUTE PUBLIC

# AUCTION

WED., APRIL 9, 10:30

THE MACHINERY, EQUIPMENT, DIES, MOLDS, MATERIALS, ETC., OF THE

## HOMAN MFG. CO.

SILVERWARE MANUFACTURERS

ON THE PREMISES

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CONSISTING OF

#### PRESSES

Toledo No. 164% Toggle Press. Two Bliss No. 73% Geared Straight Side

Presses.
Bliss No. 23 Knuckle Joint Embossing

Bliss No. 23 Knuckle Joint Embossing Press.
Bliss No. 1½ Toggle Drawing Press.
Robertson Hydraulic Press. Upward Movement. 4 Posts, 6 Inches; with Triplex Pump, 17 Inch Ram, Bed 27¾ x 31.
Robertson Hydraulic Press. 4 Posts, 5 Inches, 13 Inch Ram, Bed 27½ x 31.
Bliss No. 3½ Toggle Press.
Bliss Single Geared Double Punch Press, 31 Inches between uprights; bed area 25 Inches by 27½ Inches.
Stiles No. 5 Punch Press.

#### **GENERATORS**

Jantz & Leist Plating Motor Generator Set, Generator, Amp 500, 1,000 RPM, Volts 4/10 Motor H. P. 10, 230 1,000 RPM

with starter Voltmeter and Ammeter. Jantz & Leist Plating Motor Generator Set, Generator, Amp 400, 450, 500 RPM, Volts 7.5/2, motor 3.5 H.P., 220 Volts, 450-500 RPM with rheostat, voltmeter and ammeter

#### **ROLLING MILLS**

Mossberg and Granville No. 9 Rolling Mill, with 15 Inch dia. Rolls, 30 Inches long and electrical equipment. Rolling Mill 12" x 24" long rolls, and elec-trical equipment.

#### OTHER MACHINERY

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25 Greaves Klusman Spinning Lathes.
Shears, Siltters, Seamers, Beaders, over 40
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#### **OVER 20 TON METALS**

Pewter. Britannia, New Nickel Silver in Coils, Brass, Bronze, Unfinished Raw Materials,

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A complete line for the manufacture of modern silver plated holloware.

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Iron Leg Bench Tables, Vises, Exhaust Fans, Fire Extinguishers, Factory Trucks, Metal Cabinets, Motor, Portable Tools, Steel Storage Bins, etc.

ALL TO BE SOLD IN SINGLE LOTS WITHOUT LIMIT OR RESERVE INSPECTION DAILY PRIOR TO SALE WRITE FOR DESCRIPTIVE CIRCULAR TO

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NATIONAL Nut Tapping Machines 1/2" and BORING MILL, 56" Bullard, 2 heads, motor drive, quick change feeds. GRINDER, 14" Pratt & Whitney ball bearing surface, motor drive. GRINDER, 18"x144" Landis Plain Cylindrical MOLINE 6-spindle Whole Hog Drill. LELAND 1-spindle Ballbearing Drill. DIESEL 20 HP Fairbanks-Morse Engine motor drive.
MILLER, SD Becker vertical continuous, 40" CINCINNATI #1 Tool & Cutter Grinder. BARBER-COLMAN #2 Gear Hobbers.

MILLER, SD Becker vertical continuous, 40"
dia. rotary table.
MILLER, 25"x7"/2"x18" Oesterlein Universal
req. equip. vertical attach.
PIPE MACHINE, 6 & 8" Williams, motor dr.
PLANER, 48"x60"x14" Detrick & Harvey
Openside, 2 heads.
PLANER, 72"x60"x17" Betts, 2 heads, belted
motor drive. #2 BAKER 2" Keyseater, belt-driven. THE ELYRIA BELTING &

MACHINERY COMPANY THE O'BRIEN MACHINERY CO. ELYRIA. OHIO.

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 Working surface of table
 48" x 11"

 Longitudinal table feed
 28"

 Cross feed to saddle
 8"

 Vertical feed to knee
 19"

 Vertical adjustment of spindle head
 54.4"
 15—375 RPM -20" per min 325 RPM

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Planers, 30"x30"x18" Gray, 2 heads.
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48" Mesta Sliding Frame Cold Saw-Friction type

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1000—1200—1500; Chambersburg Board Drop
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4000; Chambersburg Double Frame Steam Forging
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1500; Erie Double Frame Steam Forging
2—1500; Erie Steam Drop
Bradley Cushioned Helve—all sizes up to 200;
Bradley Upright—all sizes to 500;
200; Beaudy Forging
11-B Nazel Forging
150-tor United Engineering Steam Hyd.

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Ten (10) 1¼" CLEVELAND Automatic Screw Machines
Model "4"s". Serials 17,000 to 18,000
Length of stock feed 8½"
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5 hole turnet, each 1¼"
Now in stock in fine operating condition

AUSTIN D. LUCAS AND COMPANY Bridgeport, Conn

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M.D.
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length of bed, closed 16'; open 23'.
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Turning Lathe.

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56, 61, 612 FELLOWS Gear Shapers 72" RUESCH Gear Cutter

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24" NILES-BEMENT-POND Crank; with 40" dia, rotary table: M.D.

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#### ANODIC PLATING Generators

3-1500 ampere

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Self or Separate excitation 10 to 40 & 10 to 60 Volts D.C. Variable Voltage or Flat Compound

at any voltage. Synchronous, Squirrel Cage or Direct Current Motor Driven

#### PROMPT SHIPMENT from STOCK

All rebuilt with 1 Year Guarantee

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Est. 1910

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## 1 NEW HYDRAULIC PRESS - NEVER USED

1310 tons Capacity

54" Right to Left 42" Front to Back Size of Bed

24" Daylight Opening

15" Maximum Stroke

36" Floor to Bed

15' Overall Height

For complete details write or wire

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MARR - GALBREATH MACHINERY COMPANY of 55 Water Street, Pittsburgh, Pa., will sell at Public Auction, April 22nd, 1941, their complete warehouse stock without limit or reserve and discontinue business as a corporation. Sale will be conducted by the Industrial Plants Corp'n of ducted by the Industrial Plants Corp'n of Ohio. Mr. J. C. Marr will trade under his own name, while Mr. M. D. Galbreath will trade as the GALBREATH MACHINERY COMPANY, having offices in the Empire Building, Pittsburgh, Pa.

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Guillotine Type Shears—1" to 5"
D. & K. High Kulfe Alligator-clutch operated Cap.
4" rd.
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210 Wells 6' Multiple Punch
259/4 S. S. Tie Rod Press
Misc. Presses — straight side — solid back — 0.8.1.
Horaing, etc.
Threaders—all sizes
Bolt, Nut & Rivet Machinery for both cold and het
manufacture
Sheet Metal Machinery:

nt, Nut & Hivet Machinery in manufacture neet Metal Machinery : 10' Geo. Ohl Press Brake Pexto 5' Bending Roll Pexto Groover Pexto Seamer Gibbs K.V.A. Spet Welder

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**Extension Type** Bennett-Rafkin Machine Tool Co., Inc. 30 Church Street New York City 30 Church Street

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AJAX STEEL BED ORIGINAL MODEL continuous type with Rivet attachment and some dies.

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B. & S. 23 Univ. Miller with Dividing Heads and Vise. Power Rapid Traverse. Practically New. No. CERS60" Vert. HI-Pd. Boring Mill, 2 Heads, M.D. V. & D. 250 ton T.R. gap frame power press. BLISS Nos. 1, 1/2, 3½A, 3¾B & 4 Toggle Presses. BLISS & TOLEDO Presses—all sizes. VODER Twenty Stand Roll Former M.D. NILSON & BAIRD Nos. 3 and 4 Wire Formers. SLEEPER & HARTLEY Nos. 2, 2½ & 4 Collers.

NATIONAL MACHINERY EXCHANGE

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LISS, TOLEDO, V & O. ET REBUILT—GUARANTEED

JOSEPH HYMAN & SONS

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-Taylor 11—Retort, type 25HC6 used with 1200 HP Boiler 19'6" wide.

Splendid condition

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FRANK B. FOSTER

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THE IRON AGE, March 27, 1941-185

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#### **Motor Driven**

3—1500 Ampere, Synchronous Motor 1—1000 Ampere 7—800 Ampere 3—500 Ampere

400 Ampere Welding Reactors nd resistance with multiple switches
8—800 Ampere Reactors, same
as 400's

#### Portable & Semi-Portable **MOTOR DRIVEN WELDERS**

Lincoln — West. — G.E. — U.S.L. Wilson, etc. -400 Ampere
7—300 Ampere
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2—150 Ampere

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50%

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JERSEY CITY, NEW JERSEY

BAVING JERSEY CITY, NEW JERSEY

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1-3000kw G.E., 600V. 3U to 4200HP 13,200V.
1-2000kw G.E., 250V. 3U to 4200HP 13,200V.
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1-1000kw MHSE. 250V. Gen to 1100HP 2300V.
1-750kw MHSE. 250V. Gen to 1100HP 2300V.
1-750kw MHSE. 250V. Gen to 700HP 3200V.
1-600kw MHSE. 250V. Gen to 700HP 3200V.
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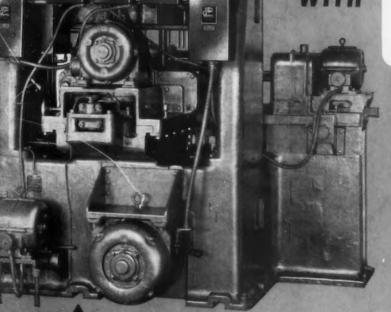
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NOT THIS: It's a lot of work to hang needed controls on a machine . . . or to install them individually nearby. Bulky, inconvenient, space-wasting, costly to assemble and install.

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